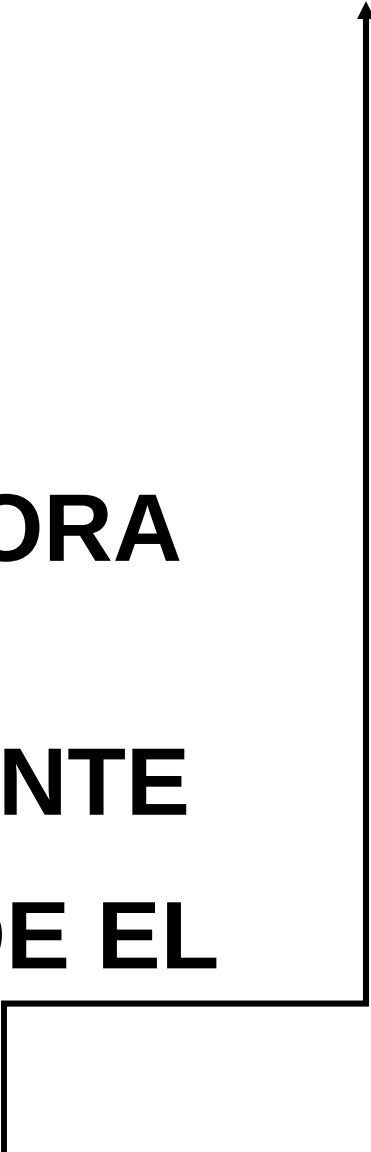


**HOJA SEPARADORA  
DEJADA  
INTENCIONALMENTE  
LE CORRESPONDE EL  
FOLIO**



**Proyecto Mina de Cobre Panamá**

**ANEXO XIX**

**Evaluación de Riesgos a la Salud Humana y a la  
Ecología**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

**ANEXO XIX**

**APÉNDICE A**

**Notas de Campo e Instrucciones Específicas del  
Trabajo**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

## ***Descripción de los Métodos de Muestreo y Análisis***

Para el análisis químico, se recolectaron muestras de suelo, vegetación nativa, invertebrados terrestres y peces. A continuación se presenta una breve descripción de los métodos de muestreo en campo y análisis de laboratorio realizados para este estudio. Al final de este Apéndice, se presentan los métodos de muestreo detallados (Instrucciones Específicas para el Trabajo) y los reportes de muestreo de campo para suelo, cultivos, vegetación e invertebrados terrestres. Los métodos de muestreo detallados para peces se presentan en los Anexos XIV (peces de agua dulce y su hábitat) y XV (biología marina). En el Anexo XIX, Apéndice Aii se presentan los métodos analíticos de laboratorio y de aseguramiento de la calidad/control de calidad (QA/QC) detallados, los límites de detección específicos, los resultados analíticos, y los resultados de QA/QC.

### **Colecta de Suelos, Cultivos y Vegetación**

Del 25 al 29 de agosto de 2008 se recogieron muestras de suelos, cultivos y vegetación. En total se recogieron muestras en tres comunidades humanas (Los Molejones, Coclesito/ Villa del Carmen y Río Caimito<sup>1</sup>) y en ocho emplazamientos no comunitarios que fueron seleccionados para representar una serie de hábitats de receptores de vida silvestre. Las ubicaciones de muestreo se muestran en el Mapa 4 del Anexo I. En cada ubicación, se recogieron muestras de suelo y plantas de dos especies. Para cada especie de planta muestreada, se recogieron muestras separadas del follaje y de otro tejido comestible (por ejemplo, frutos, semillas, tubérculos). Cada muestra de suelo o planta fue un compuesto homogenizado de múltiples submuestras (por ejemplo, cucharadas de suelo, cortes de hojas) tomadas de varias ubicaciones dentro de un área de aproximadamente 5 x 5 m. Todas las muestras de este compuesto homogenizado fueron recogidas por duplicado. Las muestras fueron recogidas en bolsas de plástico nuevas con cierres herméticos, etiquetadas, y almacenadas en hielo o congeladas hasta su envío.

Entre las especies de plantas muestreadas en comunidades humanas se encuentran el arroz (*Oryza sativa*), la yuca (*Manihot esculenta* Crantz) y el guineo (*Musa paradisiaca*). Las especies de plantas muestreadas que representan la dieta de la vida silvestre herbívora incluyeron las plantas con flores del género *Psychotria* (*P. acuminata*, *P. erecta*, *P. solitudinum*), *Vismia bilbergiana*, especie *Heliconia*, *Attalea allenii*, *Pentagonia macrophylla*, *Siparuna conica*, especie *Calyptrigine*, *Prestoea decurrens*, *Guatteria amplifolia*, Melastomoatoaceae, *Solanum rudepanum*, *Amphirox longifolia* y especie *Clusia*. Las identificaciones de especies proporcionadas en el reporte de muestreo de campo (al final del presente Apéndice) son identificaciones de campo

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<sup>1</sup> Se recogieron muestras de suelo y vegetación en siete ubicaciones dentro de las siguientes tres comunidades: Río Caimito (1 estación); Los Molejones (4 estaciones); Coclesito/Villa del Carmen (2 estaciones).



preliminares, las cuales fueron confirmadas o corregidas al momento de la exportación mediante la inspección de las muestras colectadas. Se confirmó la identificación de las especies mediante la inspección de las fotografías de las muestras recibidas por el laboratorio analítico, proporcionadas por el laboratorio analítico a solicitud de Golder.

### **Colecta de Invertebrados Terrestres**

Se recogieron muestras de suelo y de invertebrados terrestres el 25 y 26 de abril del 2009. En total se recogieron muestras en siete ubicaciones en el área de Valle Grande. En cada ubicación se separaron los invertebrados terrestres de la tierra/hojarasca retirando manualmente o tamizando la tierra/hojarasca con un tamiz de malla gruesa. Se recogieron muestras por duplicado del suelo y de los invertebrados terrestres en bolsas de plástico con cierre hermético y se almacenaron en hielo o se congelaron hasta su envío. Un entomólogo identificó en campo los invertebrados colectados. Se confirmó la identificación de las especies mediante la inspección de las fotografías de las muestras tomadas durante la colecta.

La principal especie de invertebrados terrestres muestreada fue la lombriz de tierra (*Lumbricus terrestris*). Se encontró un número suficiente de lombrices de tierra en todos los sitios para alcanzar la masa de tejido requerida para el análisis químico. En el reporte de muestreo de campo al final del presente apéndice se resumen las demás especies recogidas (y archivadas para un posible análisis futuro).

### **Colecta de Peces**

Las ubicaciones del muestreo de peces se muestran en el Mapa 17 del Anexo I y mayores detalles de las ubicaciones y métodos de muestreo se presentan en los Anexos XIV (peces de agua dulce y hábitats de peces) y XV (biología marina). Se recogieron muestras de peces de agua dulce en 20 ubicaciones del 16 al 26 de septiembre de 2007, y del 10 al 18 de marzo de 2008. Las especies recogidas fueron sábalo pipón (*Brycon chagrensis*), guavina (*Gobiomorus dormitor*), cuyamel (*Joturus pichardi*), jurel de ojo (*Caranx latus*) y cojinúa negra (*Caranx crissus*). Las especies marinas recogidas incluyeron rayas (Batoidea), mojarra (*Diapterus plumieri*, *Gerres cinereus*), ronco blanco (*Biardiella rhonchus*) y jurel (*Trachurus trachurus*). Un retraso en aduanas durante el embarque ocasionó un descongelamiento parcial de un primer envío de batoideos y *Diapterus plumieri*. De acuerdo con la recomendación del laboratorio analítico, estas muestras fueron retenidas para el análisis de metales y contaminantes orgánicos no volátiles persistentes (pesticidas, bifenilos policlorados [PCB]) pero fueron consideradas potencialmente comprometidas con respecto a los hidrocarburos aromáticos policíclicos de mayor volatilidad (PAH). Se envió un embarque adicional al laboratorio para el análisis completo de metales y contaminantes orgánicos, incluyendo hidrocarburos aromáticos policíclicos.

**Análisis de Laboratorio**

Todas las muestras se enviaron a ALS Environment Ltd. (Burnaby, British Columbia, Canadá; acreditado por la Canadian Association for Laboratory Accreditation (Asociación Canadiense para la Acreditación de Laboratorios [CALA]) para su análisis químico. Todas las muestras biológicas se analizaron como homogeneizados de tejido (hojas o fruta) o cuerpo entero (peces o invertebrados terrestres), con excepción de algunos batoideos con cuerpos de gran tamaño que no pueden homogeneizarse enteros y que fueron analizados como submuestras homogeneizadas de tejido muscular. Todas las muestras se analizaron para obtener el contenido de humedad y la gama completa de metales. Se analizaron mercurio y selenio mediante métodos de bajo nivel. Se analizó un subconjunto de muestras (aproximadamente de 10 a 20% del total) para detectar metales y una gama de contaminantes orgánicos, incluyendo pesticidas organoclorados, bifenilos policlorados (total de PCB y arocloros), y PAH. Los métodos analíticos de laboratorio y de aseguramiento de calidad/control de calidad (QA/QC) detallados, los límites de detección específicos de muestras, y los resultados de los análisis y del QA/QC se presentan en el Anexo XIX, Apéndice B.

## **ANEXO XIX**

### **APÉNDICE A-i**

#### **NOTAS DE CAMPO**

#### **MUESTREO DE CULTIVOS Y SUELO**

## REPORTE # 1

### MUESTREO DE VEGETACIÓN, SUELO Y ALIMENTO

**Comunidad: Los Molejones**

**Día: 25-agosto-2008**

**Coordenadas UTM: 0539967  
0971170**

**Cultivo Muestreado: Arroz (*Oryza sativa*) (Fotografía 1)**

Muestra realizada:

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 1 muestra del **Grano** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 1 muestra del **Grano** para análisis de **Metales**

Las 10 muestras se encuentra en un cooler refrigerado.



**Fotografía 1** Cultivo de Arroz (*Aryza sativa*)

## REPORTE # 2

### MUESTREO DE VEGETACIÓN, SUELO Y ALIMENTO

**Comunidad: Los Molejones**

**Día: 26-agosto-2008**

**Coordenadas UTM: 0540073  
0971358**

**Cultivo Muestreado: Yuca (*Manihot esculenta* Crantz) (Fotografía 2)**

Muestra realizada:

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 1 muestra del **tubérculo** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 1 muestra del **tubérculo** para análisis de **Metales**

Las 10 muestras se encuentran en un cooler refrigerado.



**Fotografía 2** Cultivo de Yuca (*Manihot esculenta* Crantz)

### REPORTE # 3

#### MUESTREO DE VEGETACIÓN, SUELO Y ALIMENTO

**Comunidad: Coclesito**

**Día: 27-agosto-2008**

**Coordenadas UTM: 0549220  
0973689**

**Cultivo Muestreado: Arroz (*Oryza sativa*) (Fotografía 3)**

Muestra realizada:

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestra del **grano** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestra del **grano** para análisis de **Metales**

Las 6 muestras de orgánico se encuentran en el congelador a temperatura bajo cero.

Las 6 muestras de metales se encuentran en el cooler a una temperatura bien fría.





**Fotografía 3** Cultivo de Arroz (*Aryza sativa*)

**Comunidad: Coclesito**

**Día: 27-agosto-2008**

**Coordenadas UTM: 0549174  
0973466**

**Cultivo Muestreado: Guineo (*Musa paradisiaca*) (Fotografía 4)**

Muestra realizada:

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestra del **fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestra del fruto para análisis de **Metales**

Las 6 muestras de orgánico se encuentran en el congelador a temperatura bajo cero.

Las 6 muestras de metales se encuentran en el cooler a una temperatura bien fría.



**Fotografía 4** Cultivo de Guineo (*Musa paradisiaca*)

## REPORTE # 4

### MUESTREO DE VEGETACIÓN, SUELO Y ALIMENTO

**Comunidad: Los Molejones**

**Día: 28-agosto-2008**

**Coordenadas UTM: 0540157  
0971080**

**Cultivo Muestreado: Guineo (*Musa paradisiaca*)**

Muestra realizada:

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestra del **Fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestra del **Fruto** para análisis de **Metales**.

Las 6 muestras para análisis orgánico se encuentran en el congelador en temperaturas bajo cero.

Las 6 muestras para análisis de metales se encuentran en un cooler refrigerado.

## REPORTE # 5

### MUESTREO DE VEGETACIÓN, SUELO Y ALIMENTO

**Comunidad:** Rio Caimito

**Día:** 29-agosto-2008

**Coordenadas UTM:** 0535252  
0996951

**Cultivo Muestreado:** Yuca (*Manihot esculenta Crantz*) (Fotografía 5)

Muestra realizada:

- 4 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 4 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 4 muestra del **tubérculo** para análisis **Orgánico**
- 4 muestras duplicadas de **Suelo** para análisis de **Metales**
- 4 muestras duplicadas de **Hojas** para análisis de **Metales**
- 4 muestra del **tubérculo** para análisis de **Metales**

Los frascos usados para las muestras de análisis orgánicos son de 125 ml por lo que se duplica la cantidad de muestras con respecto a los anteriores muestreos.

Las 16 muestras para análisis orgánico están en el congelador a temperaturas bajo cero.

Las 16 muestras para análisis de metales se encuentran en un cooler refrigerado.





**Fotografía 5 Cultivo de Yuca ( Manihot esculenta Crantz)**

**Comunidad: Río Caimito**

**Día: 29-agosto-2008**

**Coordenadas UTM: 0535257  
0996939**

**Cultivo Muestreado: Guineo (*Musa paradisiaca*)**

Muestra realizada:

- 4 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 4 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 4 muestra del **fruto** para análisis **Orgánico**
- 4 muestras duplicadas de **Suelo** para análisis de **Metales**
- 4 muestras duplicadas de **Hojas** para análisis de **Metales**
- 4 muestra del **fruto** para análisis de **Metales**.

Los frascos usados para las muestras de análisis orgánicos son de 125 ml por lo que se duplica la cantidad de muestras con respecto a los anteriores muestreos.

Las 16 muestras para análisis orgánico están en el congelador a temperaturas bajo cero.

Las 16 muestras para análisis de metales se encuentran en un cooler refrigerado.

**ANEXO XIX**

**APÉNDICE A-ii**

**NOTAS DE CAMPO**

**INVERTEBRADOS TERRESTRES**



## REPORTE DE COLECTA DE INVERTEBRADOS

**Fecha:** 25 de abril 2009

**Hora de la  
colecta:** 8:20 am

**UTM**

0533604

0996774

### **Muestras colectadas**

2 muestras de suelo  
2 muestras de hojarasca  
2 muestras de invertebrados

### **Nombre del invertebrado:**

Clase: Alelida  
Familia: Lumbricidae  
Género: *Lumbricus*  
Especie: *terrestris*



**Fecha:** 25 de abril 2009

**Hora de la  
colecta:** 10:10 am

**UTM**

0536339

0983496

### **Muestras colectadas**

2 muestras de suelo  
2 muestras de hojarasca  
2 muestras de invertebrados



**Nombre del invertebrado:**

Clase: Alelida

Familia: Lumbricidae

Género: *Lumbricus*Especie: *terrestris***Fecha:** 25 de abril 2009**Hora de la colecta:** 11:20 am**UTM**

0539137

0978279

**Muestras colectadas**

2 muestras de suelo

2 muestras de hojarasca

2 muestras de invertebrados

**Nombre del invertebrado:**

Clase: Alelida

Familia: Lumbricidae

Género: *Lumbricus*Especie: *terrestris***Fecha:** 25 de abril 2009**Hora de la colecta:** 13:20**UTM**

0534498

0976776

**Muestras colectadas**

2 muestras de suelo

2 muestras de hojarasca

2 muestras de invertebrados

**Nombre del invertebrado:**

Clase: Alelida

Familia: Lumbricidae

Género: *Lumbricus*Especie: *terrestris*

## Reporte de Colecta de Invertebrados

### Valle Grande

**Fecha:** 26 de abril 2009.

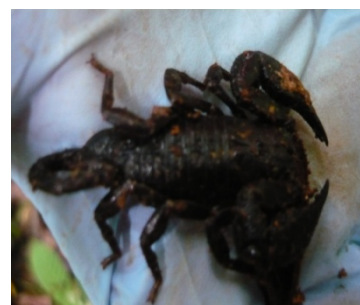
**Hora de la colecta:** 8:40 am

**Descripción:** Bosques primarios intervenidos por el hombre.

#### UTM

0535266

0975222



Scorpions

#### Muestras colectadas

2 muestras de suelo

2 muestras de hojarasca

1 muestras de invertebrados

Clase: Alelida

Familia: Lumbricidae

Género: *Lumbricus*

Especie: *terrestris*



*Lumbricus terrestris*

1 muestra de invertebrados

Orden: escorpión

Género: *opistacantus*



**Fecha:** 26 de abril 2009

**Hora de la  
colecta:** 9:15 am

**Descripción:** muestra  
colectada a orilla de un  
arroyo.

**UTM**

0534584

0975102



*Insecta elateridae*

### Muestras colectadas

2 muestras de suelo  
2 muestras de hojarasca  
1 muestra de invertebrados

Clase: Alelida  
Familia: Lumbricidae  
Género: *Lumbricus*  
Especie: *terrestris*

1 muestra de invertebrados

Clase: Insecta  
Familia: Elateridae  
Orden: Coleopterea



*Lumbricus terrestris*

**Fecha:** 26 de abril 2009

**Hora de la colecta:** 11:30 am

**Descripción:** muestra  
 colectada cerca de una  
 plataforma de perforación.

#### UTM

0536788

0975044



*Lombricus terrestris*

#### Muestras colectadas

2 muestras de suelo

2 muestras de hojarasca

1 muestra de invertebrado

Clase: Alelida

Familia: Lumbricidae

Género: *Lombricus*

Especie: *terrestris*



Diplopoda: *Polysoniioa*

1 muestra de

- Insecta: *Coleoptera Eloteridae*

- Diplopoda: *Polysoniioa millipedes*

- Insecta: *Coleoptera passalidae*

- Chilopoda: *Geophilomorfha centipedes*



Insecta: *Coleoptera passalidae*

**ANEXO XIX****APÉNDICE A-iii****NOTAS DE CAMPO****MUESTREO DE VEGETACIÓN Y SUELO**

## REPORTE # 1

### NECESIDADES DE MUESTREO DE SUELO Y VEGETACIÓN PARA LA EVALUACIÓN DE RIESGO A LA SALUD HUMANA Y A LA ECOLOGÍA

Día: 4-octubre-2008

Coordenadas UTM: 0538538  
0980036

Planta Muestreado: Palma de hojas suaves y tallo verde

Muestra realizadas a Orilla de un arroyo.

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestra del **Fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestras del **Fruto** para análisis de **Metales**.

Los frutos de estas plantas son consumidos por lo general por la ardilla (*Sciuridae*) y por el ratón de bolsa (*Heteromysidae*).

Las 12 muestras se encuentran congeladas en el refrigerador.



**Coordenadas UTM:** 0538538  
0980036

**Planta Muestreado:** *Amphirrox Longifolia*

Muestra realizadas en un Bosque Primario

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**

Las 8 muestras se encuentran congeladas en el refrigerador.



**Planta Muestreada:** *Clusia*

- 2 muestras duplicadas de **Frutos** para el análisis **Orgánico**
- 2 muestras duplicadas de **Frutos** para análisis de **Metales**

Las 4 muestras se encuentran congeladas en el refrigerador.



No se pudo identificar qué animal puede consumir este fruto.

**Coordenadas UTM: 0539137  
0978302**

Planta Muestreada: **Metastomatacea GHC - 001**

Muestra realizadas en un Bosque Primario

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestras duplicadas de **Frutos** para análisis de **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestras duplicadas de **Frutos** para análisis de **Metales**



Las 12 muestras se encuentran congeladas en el refrigerador.  
El fruto de esta planta es consumido por murciélago y aves.

**Planta Muestreada: *Guatteria amplifolia***

- 1 muestra de **Hojas** para el análisis de **Metales**
- 1 muestra de **Frutos** para análisis de **Metales**

Las 2 muestras se encuentran congeladas den el refrigerador.  
No se pudo identificar qué animal puede consumir este fruto.

**Total de muestras colectadas = 38**

- 18 muestras para análisis **Orgánico**
- 20 muestras para análisis de **Metales**

## REPORTE # 2

### NECESIDADES DE MUESTREO DE SUELO Y VEGETACIÓN PARA LA EVALUACIÓN DE RIESGO A LA SALUD HUMANA Y A LA ECOLOGÍA

Día: 5-octubre-2008

Coordenadas UTM: 0533588  
0996774

Planta Muestreado: *Psychotria* sp. GHC-002

Muestra realizada en un Bosque Secundario

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestras del **Fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestras del **Fruto** para análisis de **Metales**.



Las 12 muestras se encuentran congeladas en el refrigerador.

**Coordenadas UTM: 0536353  
0987255**

**Planta Muestreada: Palma (Arecaceae)**

Muestra realizadas en la orilla de un río.

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 1 muestra del **Fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 1 muestra del **Fruto** para análisis de **Metales**



Las 12 muestras se encuentran congeladas en el refrigerador.



**Planta Muestreada: *Pentagonia macrophylla***

- 1 muestra de **Hojas** para análisis de **Metales**
- 1 muestra del **Fruto** para análisis de **Metales**
- 1 muestra del **Fruto** para análisis **Orgánico**

**Coordenadas UTM: 0536226  
0982152**



**Planta Muestreada: *Vismia billbergiana***

Muestra realizadas en un bosque secundario.

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para análisis **Metales**
- 1 muestra del **Fruto** para análisis **Orgánico-B**
- 1 muestra de **Hojas** para análisis **Orgánico-B**
- 1 muestra de **Hojas** para análisis de **Metales-B**

- 1 muestra del **Fruto** para análisis de **Metales-B**



Las 8 muestras se encuentran congeladas en el refrigerador.



**Planta Muestreada: Heliconia**

- 1 muestra de **Hojas** para análisis **Orgánico-A**
- 1 muestra de **Hojas** para análisis de **Metales-A**
- 1 muestra del **Fruto** para análisis **Orgánico-A**
- 1 muestra del **Fruto** para análisis de **Metales-A**

Las 4 muestras se encuentran congeladas en el refrigerador.

Los frutos de esta planta son consumidos por las aves en especial el colibrí.

**Total de muestras colectadas = 37**

- **18 muestras para análisis Orgánico**
- **19 muestras para análisis de Metales**

### REPORTE # 3

## NECESIDADES DE MUESTREO DE SUELO Y VEGETACIÓN PARA LA EVALUACIÓN DE RIESGO A LA SALUD HUMANA Y A LA ECOLOGÍA

Día: 6-octubre-2008

Coordenadas UTM: 0538340  
0981770

Planta Muestreado: *Psychotria* sp. GHC - 003

Muestra realizadas en un bosque secundario.

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 2 muestras duplicadas del **Fruto** para análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para el análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 2 muestras duplicadas del **Fruto** para análisis de **Metales**



Las 12 muestras se encuentran congeladas en el refrigerador.  
Los frutos de esta planta son consumidos por lo general por aves.

**Coordenadas UTM: 0536450  
0978838**

**Planta Muestreada: Siparuna GHC-004**

Muestras realizadas a orillas de un río.

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Suelo** para el análisis de **Metales**
- 1 muestra de **Hojas** para análisis **Orgánico - A**
- 1 muestra de **Fruto** para análisis **Orgánico - A**
- 1 muestra de **Hojas** para análisis de **Metales - A**
- 1 muestra de **Fruto** para análisis de **Metales - A**



Las 8 muestras se encuentran congeladas en el refrigerador.  
Los frutos de esta planta son consumidos por lo general por aves y roedores.

### Planta Muestreada: Palma

- 1 muestra de **Hojas** para análisis **Orgánico - B**
- 1 muestra de **Fruto** para análisis **Orgánico - B**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales - B**
- 1 muestra de **Fruto** para análisis de **Metales - B**

Las 5 muestras están congeladas en el refrigerador.

Los frutos de esta planta son consumidos por roedores (ardillas, ratones, etc.)

**Coordenadas UTM:** 0534485  
0976630

### Planta Muestreada: Rubiaceae GHC - 005

- 2 muestras duplicadas de **Suelo** para el análisis **Orgánico**
- 2 muestras duplicadas de **Hojas** para análisis **Orgánico**
- 1 muestra de **Fruto** para análisis **Orgánico**



- 2 muestras duplicadas de **Suelo** para el análisis de **Metales**
- 2 muestras duplicadas de **Hojas** para análisis de **Metales**
- 1 muestra de **Fruto** para análisis de **Metales**

Las 10 muestras están congeladas en el refrigerador.

Los frutos de esta planta son consumidos por general por aves.

**Total de muestras colectadas = 34**

- 17 muestras para análisis **Orgánico**
- 17 muestras para análisis de **Metales**

## **ANEXO XIX**

### **APÉNDICE A-iv**

#### **INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

#### **MUESTREO DE PLANTAS PARA ANÁLISIS DE METALES**





**GOLDER ASSOCIATES LTD.**  
**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                           |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------|--|
| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  | <b>SWI No: 1</b>                                                                          |  |
| <b>Proyecto: Estudio de Vegetación de Línea Base para el EsIA de Minera Petaquilla</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                           |  |
| <b>Fecha: 2 de junio de 2008</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                           |  |
| <b>Autor: Mike Rankin/Audrey Wagenaar</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  | <b>Jefe de Tarea: Audrey Wagenaar (GAL NV)</b>                                            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>Revisado por: Mike Rankin (Responsable de Disciplina de Administración de Riesgos)</b> |  |
| <b>Para: Mel Zwierink (GAL Calgary)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                                                                                           |  |
| <b>cc: Archivo</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  | <b>No. de expediente:</b>                                                                 |  |
| <b>Asunto: Muestreo de Plantas de Línea Base para Análisis de Metales en el Área de Estudio de Petaquilla</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | <b>No. de trabajo/tarea: 07-1334-018/2260</b>                                             |  |
| <b>Alcance de las instrucciones específicas/del trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                           |  |
| <p><b>Objetivo:</b> El objetivo del muestreo de plantas es determinar las concentraciones de metales de línea base en plantas superficiales que crecen en el área de estudio. También se necesitará una muestra de suelo superficial adyacente a la planta (ver instrucción específica de trabajo aparte [SWI]). Los datos serán utilizados en la aplicación de evaluación humana y ecológica de línea base.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                                                                                           |  |
| <p><b>Suministros:</b> Bolsas de plástico aptas para alimentos con cierre hermético limpias para muestra (tamaño sándwich). Guantes descartables de nitrilo. Tijeras de acero inoxidable recubiertas de Teflón o de buena calidad. Cuchillo filoso de acero inoxidable. Varios paños tipo J-Cloths. Botellas de agua. Agua destilada. Detergente suave. Pala de acero inoxidable de buena calidad (no deberá tener ninguna escama de la pintura de recubrimiento en la superficie). Etiquetas preimpresas y etiquetas adicionales. Formularios para identificación de muestras. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara</p>                                                                                                                                                                                                                                                                                                                                                                       |  |                                                                                           |  |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                           |  |
| 1) Recorrer el lugar de la muestra y seleccionar una ubicación representativa del suelo con dos especies de plantas que sean más comunes en la zona y que probablemente sean consumidas por seres humanos y/o animales silvestres (de preferencia con bayas, frutos, semillas o nueces). Además, anotar cualquier observación de vida silvestre o señales de la presencia de vida silvestre.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                           |  |
| 2) Etiquetar una bolsa de plástico con cierre hermético con el número de muestra (según han sido identificadas en la lista de número de muestras adjunta), la ubicación y la fecha.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                           |  |
| 3) Usar guantes de nitrilo cada vez que tenga contacto con las plantas y cambiar los guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                           |  |
| <p>4) Seleccionar un área de aproximadamente 5 m x 5 m y tome muestras de hojas y bayas/frutos/semillas de dos especies de planta preferentes que sean utilizadas potencialmente por seres humanos (por ejemplo, para consumo o uso medicinal) o receptores ecológicos.</p> <p>Con las tijeras limpias para cortar las partes superiores de las plantas (hojas y puntas de brotes), recoger compuestos de diferentes plantas (por ejemplo, 5). Anotar el número y tipo de plantas. Anotar si cualquiera de las plantas no luce saludable – los síntomas incluyen manchas amarillas, agujeros en las hojas, plantas débiles. De cada una de las ubicaciones de muestreo, recolectar dos veces el volumen de material, mezclar y dividir en dos bolsas etiquetadas por separado como muestras individuales para el aseguramiento de la calidad. Especificar qué muestra es el duplicado en las notas de campo. En caso no sea posible obtener plantas de la misma ubicación para cada uno de los duplicados, documentar en las notas de campo.</p> |  |                                                                                           |  |
| 5) Llenar completamente una bolsa de plástico con cierre hermético de tamaño mediano con hojas y bayas/frutos/nueces/semillas y cerrar herméticamente.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                           |  |
| 6) Colocarla dentro de otra bolsa de plástico con cierre hermético, colocar una etiqueta de papel más detallada dentro de la bolsa exterior y cerrarla herméticamente.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                                                                                           |  |

## Notas de Campo e Instrucciones Específicas del Trabajo

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7) Limpiar las hojas de las tijeras y del cuchillo con una solución detergente, Enjuagar con agua destilada. Secar con un paño tipo J-cloth limpio.                                                                                                                                                                                                                                                                                                                               |
| 8) De ser posible, llevar un cooler y compresas de hielo al campo para almacenar las muestras durante el día. En las noches, transferirlas a un congelador hasta su envío al laboratorio. Si no existe espacio para un cooler, colocar las muestras en una bolsa para basura limpia y mantenerla tan fría como sea posible.                                                                                                                                                       |
| Precauciones: Asegurarse de manipular siempre las plantas con guantes y preferiblemente con ningún objeto de metal (para el análisis de metales). Cambiar de guantes entre la toma de muestras. No utilizar ninguna planta que se haya caído al suelo de manera accidental, recolectar una nueva.                                                                                                                                                                                 |
| <b>Ubicaciones de muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1) Hojas y bayas – Dieciocho ubicaciones de muestreo en el área del proyecto para la colecta de hojas y bayas/frutos/semillas/nueces. Las muestras de hojas y bayas/frutos/semillas/nueces deben provenir de las mismas plantas. Se deberá seleccionar las ubicaciones de manera que éstas reflejen el uso local y ambiente ecológico pero deben tener una cobertura vegetal adecuada para obtener todas las muestras necesarias. Duplicar las muestras en todas las ubicaciones. |
| 2) Obtener las ubicaciones que figuran en la unidad GPS para cada ubicación de muestreo y registrarlas en el siguiente cuadro.                                                                                                                                                                                                                                                                                                                                                    |
| 3) Tomar fotografías de cada planta, la ubicación de la muestra y del área en general.                                                                                                                                                                                                                                                                                                                                                                                            |
| 4) Completar una Hoja de Identificación de Muestras para cada ubicación (ver modelo adjunto).                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Instrucciones de envío:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.                                                                                                                                                                                                                                                                                                                                                           |
| 2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar la intención de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar, con copia a Mike Rankin.                                                                                                                                                                                   |
| 3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>“SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN”</b> . Se deberá añadir un valor nominal de \$20 en el formulario de declaración.                                                                                                                                                                                                                     |
| <b>Cadena de custodia:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1) Asegurarse de que la cadena de custodia incluya los códigos de los análisis indicados en la tabla a continuación                                                                                                                                                                                                                                                                                                                                                               |
| 2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b>“Muestras de plantas. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates Vancouver, 604-986-4331 para obtener instrucciones para los análisis”</b> .                                                                                                                                                                                                                |
| 3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn, así como una copia a Mike Rankin antes del envío de las muestras.                                                                                                                                                                                                                                                                                                                               |
| 4) Asegurarse además de que haya una nota resaltada que indique que se debe lavar la vegetación (enjuagar con agua destilada).                                                                                                                                                                                                                                                                                                                                                    |

## Números de las Muestras:

| Descripción de la Muestra | Hojas          | Bayas/Frutos/<br>Nueces/Semillas | Ubicaciones en<br>GPS |
|---------------------------|----------------|----------------------------------|-----------------------|
| Especie #1                | SRLM - 1a, b   | SRBM - 1 a, b                    |                       |
|                           | SRLM - 2 a, b  | SRBM - 2 a, b                    |                       |
|                           | SRLM - 3 a, b  | SRBM - 3 a, b                    |                       |
|                           | SRLM - 4 a, b  | SRBM - 4 a, b                    |                       |
|                           | SRLM - 5 a, b  | SRBM - 5 a, b                    |                       |
|                           | SRLM - 6 a, b  | SRBM - 6 a, b                    |                       |
|                           | SRLM - 7 a, b  | SRBM - 7 a, b                    |                       |
|                           | SRLM - 8 a, b  | SRBM - 8 a, b                    |                       |
|                           | SRLM - 9 a, b  | SRBM - 9 a, b                    |                       |
| Especie #2                | SRLM - 10 a, b | SRBM - 10 a, b                   |                       |
|                           | SRLM - 11 a, b | SRBM - 11 a, b                   |                       |
|                           | SRLM - 12 a, b | SRBM - 12 a, b                   |                       |
|                           | SRLM - 13 a, b | SRBM - 13 a, b                   |                       |
|                           | SRLM - 14 a, b | SRBM - 14 a, b                   |                       |
|                           | SRLM - 15 a, b | SRBM - 15 a, b                   |                       |
|                           | SRLM - 16 a, b | SRBM - 16 a, b                   |                       |
|                           | SRLM - 17 a, b | SRBM - 17 a, b                   |                       |
|                           | SRLM - 18 a, b | SRBM - 18 a, b                   |                       |

**Envío:**

Enviar las muestras congeladas, embaladas con compresas de hielo, a:

ALS Laboratories  
1988 Triumph Street  
Vancouver, BC  
Canadá, V5L 1K5  
Tel: 1-(604)-253-4188 o 1-(800)-665-0243 (número gratuito)  
Correo electrónico: Vancouver@alsenviro.com

Incluir el formulario de la cadena de custodia con las siguientes instrucciones: ***“Muestras de plantas. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates North Vancouver, 604-986-4331 para obtener instrucciones para los análisis”. Asegurarse de que la cadena de custodia indique que se deben lavar las muestras (enjuagar con agua destilada).***

**Producto(s) de trabajo a ser entregado(s):** del 1 al 13 de junio de 2008.

**Horas-hombre asignadas:** actividad integrada con el muestreo de suelo.

**Subcontratista (según corresponda):** Ninguno.

**Requerimientos especiales para manipulación:** Mantener la muestra congelada o tan fría como sea posible.

**Especificaciones y procedimientos aplicables:** Ninguno.

**Aprobación del Gerente de Proyecto /Fecha:**      **Responsable de Control de Calidad/Fecha:**

**ANEXO XIX**

**APÉNDICE A-v**

**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

**MUESTREO DE PLANTAS PARA ANÁLISIS ORGÁNICO**



**GOLDER ASSOCIATES LTD.**  
**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  | <b>SWI No: 2</b>                                                                                                                            |
| <b>Proyecto:</b> Estudio de Vegetación de Línea Base para el EslA de Minera Petaquilla<br><b>Fecha:</b> 2 de junio de 2008<br><b>Autor:</b> Mike Rankin/Audrey Wagenaar<br><b>Para:</b> Mel Zwierink (GAL Calgary)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | <b>Jefe de Tarea:</b> Audrey Wagenaar (GAL NV)<br><b>Revisado por:</b> Mike Rankin (Responsable de Disciplina de Administración de Riesgos) |
| <b>cc:</b> Archivo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | <b>No. de Expediente:</b>                                                                                                                   |
| <b>Asunto:</b> Muestreo de Plantas de Línea Base para el Análisis de Material Orgánico en el Área de Estudio de Petaquilla                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>No. de trabajo/tarea:</b> 07-1334-018/2260                                                                                               |
| <b>Alcance de las instrucciones específicas/del trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                                                                                             |
| <b>Objetivo:</b> El objetivo del muestreo de plantas es determinar las concentraciones de metales de línea base en las plantas que crecen en el área de estudio. También se requerirá tomar muestras del suelo superficial adyacente a la planta (ver SWI 3 y 4 para colecta de suelo). Los datos serán utilizados en la evaluación de riesgo de línea base para la salud humana y la ecología.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                                                                             |
| <b>Suministros:</b> Frascos de vidrio limpios de 250 ml. Guantes descartables de nitrilo. Tijeras de acero inoxidable recubiertas de Teflón o de buena calidad. Cuchillo filoso de acero inoxidable. Varios paños tipo J-Cloths. Botellas de agua. Agua destilada. Detergente suave. Pala de acero inoxidable de buena calidad (no deberá tener ninguna escama de la pintura de recubrimiento en la superficie). Etiquetas preimpresas y etiquetas adicionales. Formularios para identificación de muestras. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                             |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                             |
| 1) Recorrer el sitio de muestreo y seleccionar una ubicación de suelo representativa con dos especies de plantas que sean las más comunes en la zona y que probablemente sean consumidas por seres humanos y/o animales silvestres (de preferencia con bayas, frutos, semillas o nueces). Además, anotar cualquier observación de vida silvestre o señales de la presencia de vida silvestre.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                                                                                                             |
| 2) Etiquetar un frasco de vidrio de 250 ml para cada muestra con el número de muestra (según han sido identificadas en la lista de número de muestras adjunta), la ubicación y la fecha. Un frasco para muestras de hojas y otro para las muestras de bayas/frutos/nueces/semillas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                                                                                                                                             |
| 3) Usar guantes de nitrilo cada vez que tenga contacto con las plantas y cambiar de guantes entre la toma de muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                                                                             |
| 4) Seleccionar un área de aproximadamente 5 m x 5 m y tomar muestras de hojas y bayas/frutos/semillas de dos especies de planta preferentes que sean utilizadas potencialmente por seres humanos (por ejemplo, para consumo o uso medicinal) o receptores ecológicos en áreas que estén cerca de zonas agrícolas, vías o poblados. Las ubicaciones de muestreo deberán corresponder a aquellas en los que se han recolectado suelo y vegetación para el análisis de metales.<br><br>Con las tijeras limpias para cortar las partes superiores de las plantas (hojas y puntas de brotes), recolectar compuestos de diferentes plantas (por ejemplo, 5). Anotar el número y tipo de plantas. Anotar si cualquiera de las plantas no luce saludable – los síntomas incluyen manchas amarillas, agujeros en las hojas, plantas débiles.<br><br>De cada una de las ubicaciones de muestreo, recolectar dos veces el volumen de material, mezclar y dividir en dos bolsas etiquetadas por separado como muestras individuales para el aseguramiento de la calidad. Especificar qué muestra es el duplicado en las notas de campo. En caso no sea posible obtener plantas de la misma ubicación para cada uno de los duplicados, documentar en las notas de campo. |  |                                                                                                                                             |

## Notas de Campo e Instrucciones Específicas del Trabajo

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5) Llenar completamente un frasco de vidrio de 250 ml con hojas y otro con bayas/frutos/nueces/semillas, en caso estén disponibles, y cerrar herméticamente los frascos.                                                                                                                                                                                                                                                                                                     |
| 6) Limpiar las hojas de las tijeras y del cuchillo con una solución detergente, Enjuagar con agua destilada. Secar con un paño tipo J-cloth limpio.                                                                                                                                                                                                                                                                                                                          |
| 7) De ser posible, llevar un cooler y compresas de hielo al campo para almacenar las muestras durante el día. En las noches, transferirlas a un congelador hasta su envío al laboratorio. Si no existe espacio para un cooler, colocar las muestras en una bolsa para basura limpia y mantenerla tan fría como sea posible.                                                                                                                                                  |
| Precauciones: Asegurarse de manipular siempre las plantas con guantes. Cambiar los guantes entre la toma de muestras. No utilizar ninguna planta que se haya caído al suelo de manera accidental, recolectar una nueva.                                                                                                                                                                                                                                                      |
| <b>Ubicaciones de muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1) Hojas y bayas – Tres ubicaciones de muestreo en el área del proyecto para la colecta de hojas y bayas/frutos/semillas/nueces. Las muestras de hojas y bayas/frutos/semillas/nueces deben provenir de las mismas plantas. Se deberá seleccionar las ubicaciones de manera que éstas reflejen el uso local y ambiente ecológico pero deben tener una cobertura vegetal adecuada para obtener todas las muestras necesarias. Duplicar las muestras en todas las ubicaciones. |
| 2) Obtener las ubicaciones que figuran en la unidad GPS para cada ubicación de muestreo y registrarlas en el siguiente cuadro.                                                                                                                                                                                                                                                                                                                                               |
| 3) Tomar fotografías de cada planta, la ubicación de la muestra y del área en general.                                                                                                                                                                                                                                                                                                                                                                                       |
| 4) Completar una Hoja de Identificación de Muestras para cada ubicación (ver modelo adjunto).                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Instrucciones de envío:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.                                                                                                                                                                                                                                                                                                                                                      |
| 2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar la intención de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar, con copia a Mike Rankin.                                                                                                                                                                              |
| 3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>“SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN”</b> . Se deberá añadir un valor nominal de \$20 en el formulario de declaración.                                                                                                                                                                                                                |
| <b>Cadena de custodia:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1) Asegurarse de que la cadena de custodia incluya los códigos de los análisis indicados en la tabla a continuación                                                                                                                                                                                                                                                                                                                                                          |
| 2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b>“Muestras de plantas. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates Vancouver, 604-604-986-4331 para obtener instrucciones para los análisis”</b> .                                                                                                                                                                                                       |
| 3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn, así como una copia a Mike Rankin antes del envío de las muestras.                                                                                                                                                                                                                                                                                                                          |
| 4) Asegurarse además de que exista una nota resaltada que indique que se debe lavar la vegetación (enjuagar con agua destilada).                                                                                                                                                                                                                                                                                                                                             |



### Número de las Muestras

| Descripción de la Muestra | Hojas        | Bayas/Frutos/<br>Nueces/Semillas | Ubicación en<br>GPS |
|---------------------------|--------------|----------------------------------|---------------------|
| Especie #1                | SRLO – 1 a,b | SRBO - 1 a,b                     |                     |
| Especie #2                | SRLO – 2 a,b | SRBO - 2 a,b                     |                     |

#### Envío:

Enviar las muestras congeladas, embaladas con compresas de hielo, a:

ALS Laboratories  
 1988 Triumph Street  
 Vancouver, BC  
 Canadá, V5L 1K5  
 Tel: 1-(604)-253-4188 o 1-(800)-665-0243 (llamada gratuita)  
 Correo electrónico: Vancouver@alsenviro.com

Incluir el formulario de la cadena de custodia con las siguientes instrucciones: “**Muestras de plantas. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates North Vancouver, 604-986-4331 para obtener instrucciones para los análisis**”. Asegurarse de que la cadena de custodia indique que se deben lavar las muestras (enjuagar con agua destilada).

**Producto(s) de trabajo a ser entregado(s):** del 1 al 13 de junio de 2008.

**Horas-hombre asignadas:** actividad integrada con el muestreo de suelo.

**Subcontratista (según corresponda):** Ninguno.

**Requerimientos especiales para manipulación:** Mantener la muestra congelada o tan fría como sea posible.

**Especificaciones y procedimientos aplicables:** Ninguno.

**Aprobación del Gerente de Proyecto /Fecha:**      **Responsable de Control de Calidad/Fecha:**

**ANEXO XIX****APÉNDICE A-vi****INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO****MUESTREO DE SUELO PARA ANÁLISIS DE METALES**



**GOLDER ASSOCIATES LTD.**  
**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                           |                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------|
| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                           | <b>SWI No: 3</b> |
| <b>Estudio de Vegetación de Línea Base para el EsIA de MineraPetaquilla</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                           |                  |
| <b>Fecha: 2 de junio de 2008</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                           |                  |
| <b>Autor: Mike Rankin/Audrey Wagenaar</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Gerente del Proyecto: Audrey Wagenaar (GAL NV)</b>                                     |                  |
| <b>Para: Mel Zwierink (GAL Calgary)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Revisado por: Mike Rankin (Responsable de Disciplina de Administración de Riesgos)</b> |                  |
| <b>cc: Archivo</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>No. de expediente:</b>                                                                 |                  |
| <b>Asunto: Estudio de Línea Base de Calidad de Suelos para el EsIA de MineraPetaquilla - Metales</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>No. de trabajo/tarea: 07-1334-018/2260</b>                                             |                  |
| <b>Alcance de las instrucciones específicas/del trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                           |                  |
| <b>Objetivo:</b> El objetivo del muestreo de suelo es determinar las concentraciones de metales en el sustrato en el que crecen las plantas. Estos datos serán utilizados para determinar los factores de absorción de los metales del sustrato con respecto a las hojas y las bayas/frutos.                                                                                                                                                                                                                                                                                                                                                                         |                                                                                           |                  |
| <b>Suministros:</b> Bolsas de plástico aptas para alimentos con cierre hermético limpias para muestra (tamaño mediano). Guantes descartables de nitrilo. Tijeras de acero inoxidable recubiertas de Teflón o de buena calidad. Cuchillo filoso de acero inoxidable. Varios paños tipo J-Cloths. Botellas de agua. Agua destilada. Detergente suave. Pala de acero inoxidable de buena calidad (no debería tener ninguna escama de la pintura de recubrimiento en la superficie). Etiquetas preimpresas y etiquetas adicionales. Formularios para identificación de muestras. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara. |                                                                                           |                  |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                           |                  |
| 1) Etiquetar las bolsas de plástico con cierre hermético colocando el número de muestra (según han sido identificadas en la lista de número de muestras adjunta), la ubicación y la fecha.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                           |                  |
| 2) Usar guantes de nitrilo cada vez que haya contacto con el suelo y cambiar de guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                           |                  |
| 3) Tomar muestras del suelo del área de las plantas de las que se está tomando muestras de hojas y raíces y otras muestras representativas del área de estudio. Tomar por lo menos 3 lampas, mezclándolas bien para obtener una muestra compuesta. Tomar muestras dobles en todas las ubicaciones.                                                                                                                                                                                                                                                                                                                                                                   |                                                                                           |                  |
| 4) Registrar la profundidad del suelo. Tomar la muestra de la profundidad del suelo si tiene menos de 10 cm de profundidad. Registrar las características del suelo (ver el formulario de identificación de muestras adjunto). Anotar la ubicación que figura en la unidad GPS. Tomar una fotografía en primer plano del lugar de la muestra del suelo. Llenar con tierra de ¼ a ½ la bolsa de plástico con cierre hermético (por lo menos 200 g).                                                                                                                                                                                                                   |                                                                                           |                  |
| 5) Sacar el aire de la bolsa y cerrarla herméticamente. Colocarla dentro de otra bolsa de plástico con cierre hermético, colocar una etiqueta de papel más detallada dentro de la bolsa externa y cerrarla herméticamente.                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                           |                  |
| 6) Entre muestras, limpiar la paleta con una solución detergente. Enjuagar con agua destilada. Secar con paño tipo J-cloth limpio.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                           |                  |
| 7) De ser posible, llevar un cooler y compresas de hielo al campo para almacenar las muestras durante el día. Las muestras del suelo deben colocarse en un cooler con compresas de hielo para ser transportadas al laboratorio. Si no existe espacio para un cooler, colocar las muestras en una bolsa para basura limpia y mantenerla tan fría como sea posible.                                                                                                                                                                                                                                                                                                    |                                                                                           |                  |
| <b>Precauciones:</b> Asegurarse de manipular siempre la tierra con guantes y nunca con objetos de metal (salvo que hayan sido lavados minuciosamente). Cambiar de guantes entre la toma de muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                           |                  |

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ubicaciones de muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>1) Dieciocho muestras de ubicaciones donde se recogieron hojas de plantas y bayas/frutos/nueces/semillas. La lógica para seleccionar estas áreas es representar las concentraciones de metales de línea base en el lugar y, por lo tanto, las ubicaciones deberán reflejar el uso local y el ambiente ecológico. Duplicar las muestras en todas las ubicaciones.</p> <p>2) Diecinueve muestras adicionales de las áreas cerca a comunidades, carreteras y zonas agrícolas. Duplicar las muestras en todas las ubicaciones.</p> <p>3) Registrar las ubicaciones que figuran en la unidad GPS para cada ubicación de muestreo en la tabla a continuación.</p> <p>4) Completar una Hoja de Identificación de Muestras para cada ubicación (ver modelo adjunto).</p> |
| <b>Instrucciones de envío:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.</p> <p>2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar la intención de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar, con copia a Mike Rankin.</p> <p>3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>“SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN”</b>. Se deberá añadir un valor nominal de \$20 en el formulario de declaración.</p>                                                           |
| <b>Cadena de custodia:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>1) Asegurarse de que la cadena de custodia incluya los códigos de los análisis indicados en la tabla a continuación</p> <p>2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b>“Muestras de suelo. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates Vancouver, 604-296-4200 para obtener instrucciones para los análisis”</b>.</p> <p>3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn, así como una copia a Mike Rankin antes del envío de las muestras.</p>                                                                                                                                                                                                        |

**Números de las Muestras:**

| Descripción de la Muestra          | Suelo         | Ubicaciones en GPS |
|------------------------------------|---------------|--------------------|
| Especies de Plantas #1             | SRSM - 1 a,b  |                    |
|                                    | SRSM - 2 a,b  |                    |
|                                    | SRSM - 3 a,b  |                    |
|                                    | SRSM - 4 a,b  |                    |
|                                    | SRSM - 5 a,b  |                    |
|                                    | SRSM - 6 a,b  |                    |
|                                    | SRSM - 7 a,b  |                    |
|                                    | SRSM - 8 a,b  |                    |
|                                    | SRSM - 9 a,b  |                    |
| Especies de Plantas #2             | SRSM - 10 a,b |                    |
|                                    | SRSM - 11 a,b |                    |
|                                    | SRSM - 12 a,b |                    |
|                                    | SRSM - 13 a,b |                    |
|                                    | SRSM - 14 a,b |                    |
|                                    | SRSM - 15 a,b |                    |
|                                    | SRSM - 16 a,b |                    |
|                                    | SRSM - 17 a,b |                    |
|                                    | SRSM - 18 a,b |                    |
| <i>Otras Ubicaciones de Suelos</i> |               |                    |
|                                    | SRSM - 19 a,b |                    |
|                                    | SRSM - 20 a,b |                    |
|                                    | SRSM - 21 a,b |                    |
|                                    | SRSM - 22 a,b |                    |
|                                    | SRSM - 23 a,b |                    |
|                                    | SRSM - 24 a,b |                    |
|                                    | SRSM - 25 a,b |                    |
|                                    | SRSM - 26 a,b |                    |
|                                    | SRSM - 27 a,b |                    |
|                                    | SRSM - 28 a,b |                    |
|                                    | SRSM - 29 a,b |                    |
|                                    | SRSM - 30 a,b |                    |
|                                    | SRSM - 31 a,b |                    |
|                                    | SRSM - 32 a,b |                    |
|                                    | SRSM - 33 a,b |                    |
|                                    | SRSM - 34 a,b |                    |
|                                    | SRSM - 35 a,b |                    |
|                                    | SRSM - 36 a,b |                    |
|                                    | SRSM - 37 a,b |                    |

## Notas de Campo e Instrucciones Específicas del Trabajo

**Envío:**

Enviar las muestras congeladas, embaladas con compresas de hielo, a:

ALS Laboratories  
1988 Triumph Street  
Vancouver, BC  
Canadá, V5L 1K5  
Tel: 1-(604)-253-4188 o 1-(800)-665-0243 (número gratuito)  
Correo electrónico: Vancouver@alsenviro.com

Incluir el formulario de la cadena de custodia con las siguientes instrucciones: ***“Muestras de suelo. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates North Vancouver, 604-296-4200 para obtener instrucciones para los análisis”.***

|                                                                                                      |
|------------------------------------------------------------------------------------------------------|
| <b>Producto(s) de trabajo a ser entregado(s):</b> del 1 al 13 de junio de 2008.                      |
| <b>Horas-hombre asignadas:</b> actividad integrada con el muestreo de suelo.                         |
| <b>Subcontratista (según corresponda):</b> Ninguno.                                                  |
| <b>Requisitos especiales para manipulación:</b> Mantener la muestra tan fría como sea posible        |
| <b>Especificaciones y procedimientos aplicables:</b> Ninguno.                                        |
| <b>Aprobación del Gerente del Proyecto /Fecha:</b> <b>Responsable del Control de Calidad /Fecha:</b> |



## **ANEXO XIX**

### **APÉNDICE A-vii**

#### **INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

#### **MUESTREO DE SUELO PARA ANÁLISIS ORGÁNICO**



## GOLDER ASSOCIATES LTD.

## INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  |                                                                                           |
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| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | <b>SWI No: 4</b>                                                                          |
| <b>Proyecto:</b> Estudio de Vegetación de Línea Base para el EsIA de MineraPetaquilla<br><b>Fecha:</b> 2 de junio de 2008<br><b>Autor:</b> Mike Rankin/Audrey Wagenaar                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <b>Gerente del Proyecto:</b> Audrey Wagenaar (GAL NVAN)                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  | <b>Revisado por:</b> Mike Rankin (Responsable de Disciplina de Administración de Riesgos) |
| <b>Para:</b> Mel Zwierink (GAL Calgary)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                           |
| <b>cc:</b> Archivo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | <b>No. de expediente:</b>                                                                 |
| <b>Asunto:</b> Estudio de Línea Base de Calidad de Suelos para el EsIA de MineraPetaquilla - Orgánicos                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  | <b>No. de trabajo/tarea:</b> 07-1334-018/2260                                             |
| <b>Alcance de las instrucciones específicas/del trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                                                                                           |
| <b>Objetivo:</b> El objetivo del muestreo de suelos es determinar las concentraciones de materiales orgánicos en el sustrato en el que crecen plantas. Estos datos serán utilizados para determinar los factores de absorción de materiales orgánicos del sustrato con respecto a hojas y bayas/frutos.                                                                                                                                                                                                                                                                                             |  |                                                                                           |
| <b>Suministros:</b> Frascos de vidrio limpios de 250 ml. Guantes descartables de nitrilo. Tijeras de acero inoxidable recubiertas de Teflón o de buena calidad. Cuchillo filoso de acero inoxidable. Varios paños tipo J-Cloths. Botellas de agua. Agua destilada. Detergente suave. Pala de acero inoxidable de buena calidad (no deberá tener ninguna escama de la pintura de recubrimiento en la superficie). Etiquetas preimpresas y etiquetas adicionales. Formularios para identificación de muestras. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara |  |                                                                                           |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                                                                                           |
| 1) Etiquetar los frascos de vidrio de 250 ml colocando el número de muestra (según han sido identificadas en la lista de número de muestras adjunta), la ubicación y la fecha.                                                                                                                                                                                                                                                                                                                                                                                                                      |  |                                                                                           |
| 2) Usar guantes de nitrilo cada vez que haya contacto con el suelo y cambiar de guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                                                                                           |
| 3) Tomar muestras del suelo del área de las plantas de las que está tomando muestras de hojas y también otras áreas según se describe en la sección de ubicación de muestreo. Tomar por lo menos 6 lampas, mezclándolas bien para obtener una muestra compuesta y dividirla en dos frascos etiquetándolos separadamente como muestras individuales para control de calidad.                                                                                                                                                                                                                         |  |                                                                                           |
| 4) Registrar la profundidad del suelo. Tomar la muestra de la profundidad del suelo si tiene menos de 10 cm de profundidad. Registrar las características del suelo (ver el formulario de identificación de muestras adjunto). Anotar la ubicación que figura en la unidad GPS. Tomar una fotografía en primer plano del lugar de la muestra de suelo.                                                                                                                                                                                                                                              |  |                                                                                           |
| 5) Llenar completamente un frasco de vidrio de 250 mL con tierra y cerrar la tapa bien ajustada.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                                                                                           |
| 6) Entre muestras, limpiar la paleta con una solución detergente. Enjuagar con agua destilada. Secar un con paño limpio tipo J-cloth.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |                                                                                           |
| 7) De ser posible, traer una nevera portátil y compresas de hielo al campo para almacenar las muestras durante el día. Las muestras de suelo deben colocarse en una nevera portátil con compresas de hielo para ser transportadas al laboratorio. Si no existe espacio para una nevera portátil, colocar las muestras en una bolsa para basura limpia y mantenerla tan fría como sea posible.                                                                                                                                                                                                       |  |                                                                                           |
| <b>Precauciones:</b> Asegurarse de que siempre se manipule la tierra con guantes y nunca con objetos de plástico. Cambiar de guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                                                                                           |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Ubicaciones de muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>1) Dos muestras de las ubicaciones donde se recogieron hojas de plantas y bayas/frutos/nueces/semillas. La lógica para seleccionar estas áreas es representar las concentraciones de metales de línea base en el lugar y, por lo tanto, las ubicaciones deberán reflejar el uso local y el ambiente ecológico. Tomar muestras dobles en cada ubicación.</p> <p>2) Una muestra de "Otras Ubicaciones" - áreas cerca a comunidades, carreteras y zonas agrícolas. Tomar muestras dobles en esta ubicación.</p> <p>3) Obtener las ubicaciones que figuran en la unidad GPS para cada toma de muestras y anotarlas en la tabla.</p>                                                                      |
| <b>Instrucciones de envío:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.</p> <p>2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar el intento de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar, con copia a Mike Rankin.</p> <p>3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>"SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN"</b>. Se deberá añadir un valor nominal de \$20 en el formulario de declaración.</p> |
| <b>Cadena de custodia:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p>1) Asegurarse de que la cadena de custodia incluya los códigos de los análisis indicados en la tabla a continuación.</p> <p>2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b><i>"Muestras de suelo. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates North Vancouver, 604-986-4331 para obtener instrucciones para los análisis"</i></b>.</p> <p>3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn, así como una copia a Mike Rankin antes del envío de muestras.</p>                                                                                                                                  |

### Números de las Muestras:

| Descripción de la Muestra   | Suelo        | Ubicaciones en GPS |
|-----------------------------|--------------|--------------------|
| Especies de plantas #1      | SRSO – 1 a,b |                    |
| Especies de plantas #2      | SRSO – 2 a,b |                    |
| Otras ubicaciones de suelos | SRSO – 3 a,b |                    |

### Envío:

Enviar las muestras congeladas, embaladas con compresas de hielo, a:

ALS Laboratories

1988 Triumph Street  
 Vancouver, BC

Canadá, V5L 1K5  
 Tel: 1-(604)-253-4188 o 1-(800)-665-0243 (línea gratuita)  
 Correo electrónico: Vancouver@alsenviro.com

Incluir el formulario de la cadena de custodia con las siguientes instrucciones: ***“Muestras de suelo. Refrigerar y comunicarse con Adrian de Bruyn/Audrey Wagenaar, Golder Associates North Vancouver, 604-986-4331 para obtener instrucciones para los análisis”.***

**Producto(s) del trabajo a ser entregado(s):** del 1 al 13 de junio de 2008.

**Horas-hombre asignadas:** actividad integrada con el muestreo del suelo.

**Subcontratista (según corresponda):** Ninguno.

**Requisitos especiales para manipulación:** Mantener la muestra tan fría como sea posible.

**Especificaciones y procedimientos aplicables:** Ninguno.

**Aprobación del Gerente del Proyecto /Fecha:**

**Responsable del Control de Calidad /Fecha:**

**ANEXO XIX****APÉNDICE A-viii****INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO****MUESTREO DE INVERTEBRADOS PARA ANÁLISIS DE METALES**



**GOLDER ASSOCIATES LTD.**  
**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-------------------------|
| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              | <b>SWI No: 1</b>        |
| <b>Proyecto:</b> Línea Base de la EIAS de Petaquilla, Muestreo de Invertebrados en Valle Grande<br><b>Fecha:</b> 2 de abril de 2009<br><b>Autor:</b> Adrian deBruyn<br><b>Administrador de Tareas:</b> Adrian deBruyn (GAL Burnaby)<br><b>Revisado por:</b> Audrey Wagenaar (Responsable de Disciplina de Administración de Riesgos)<br><b>Para:</b> Darcy Warner (GAL Calgary)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |                         |
| <b>cc:</b> Archivo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>No. de expediente:</b>    |                         |
| <b>Asunto:</b> Muestreo de Invertebrados de Línea Base para el Análisis de Metales en el Área de Estudio de Petaquilla                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>No. de trabajo/tarea:</b> | <b>07-1334-018/2240</b> |
| <b>Alcance de las instrucciones específicas/de trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |                         |
| <b>Objetivo:</b> El objetivo del muestreo de invertebrados es determinar las concentraciones de metales de línea base en invertebrados asociados con suelos u hojarasca que viven en el área de estudio. También se necesitarán muestras de suelos superficiales y hojarascas de las mismas ubicaciones como muestras de invertebrados (ver la instrucción específica de trabajo separada [SWI]). Los datos se usarán en la evaluación de riesgo ecológico y humano de línea base.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |                         |
| <b>Suministros:</b> Bolsas de plástico aptas para alimentos con cierre hermético limpias para muestra (tamaño sándwich). Guantes descartables de nitrilo. Etiquetas preimpresas y etiquetas adicionales. Cuadernos de campo. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara. Tamices para suelo y/o otros equipos para recolección de insectos (las especificaciones serán determinadas por el entomólogo local de acuerdo a las condiciones del campo). Recipiente o bandeja para clasificar invertebrados. Balanza portátil para pesar muestras, de ser posible.                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |                         |
| <b>Personal:</b> De ser posible, el entomólogo deberá acompañar al equipo de campo a seleccionar e identificar las especies muestreadas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                         |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |                         |
| 1) Seleccionar la ubicación de la muestra con cobertura de suelo y/o de hojarasca que puedan contener invertebrados (es decir, no rocas/arena).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |                         |
| 2) Etiquetar dos (2) bolsas de plástico con cierre hermético y colocar el número de muestra, la ubicación que figura en la unidad GPS y la fecha.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              |                         |
| 3) Usar guantes de nitrilo cada vez que haya contacto con invertebrados y cambiar de guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |                         |
| 4) Separar los invertebrados del suelo/hojarasca utilizando técnicas adecuadas para especies presentes y características del suelo/hojarasca. Los métodos pueden incluir recolección o tamizado manual de suelos/hojarasca mediante un tamiz de malla gruesa. No conservar ningún espécimen que esté muy dañado (es decir, triturado) durante el muestreo (la pérdida de patas se puede admitir).<br>Conservar los invertebrados que presentan las siguientes características:<br>- Especies que consumen tierra/hojarasca de la superficie (por ejemplo, milpiés) o se alimentan de manera omnívora en suelo/hojarasca (por ejemplo, algunos escarabajos); <u>no</u> recolectar herbívoros/fungívoros o larvas acuáticas en etapa adulta, o depredadores que probablemente se alimentan de herbívoros/fungívoros o larvas acuáticas en etapa adulta (por ejemplo, no orugas, hormigas, termitas, arañas).<br>- Especies con movilidad limitada, de manera que residen en el área local (por ejemplo, dentro de unos pocos |                              |                         |

## Notas de Campo e Instrucciones Específicas del Trabajo

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>cientos de metros); no recolectar especies con alta movilidad.</p> <p>- Se prefieren las especies de cuerpo grande o abundante; de ser posible, recolectar una única especie (o taxón mayor, por ejemplo milpiés) en cada lugar. Si no hay un solo taxón que proporcione suficiente masa de tejido, combinar especies múltiples según se requiera para preparar las muestras.</p> <p>- De ser posible, recolectar las mismas especies o un taxón mayor (por ejemplo, milpiés) en todos los lugares.</p>                                                                                                                                                                     |
| <p>5) Colocar una muestra de invertebrados de 10-20 g en cada dos (2) bolsas de plástico con cierre hermético medianas etiquetadas (una muestra y una duplicada) y cerrarlas bien. Registrar la lista de especies en cada muestra en la etiqueta de la muestra y en las notas de campo.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>6) Colocar cada una dentro de otra bolsa de plástico con cierre hermético, colocar una etiqueta de papel detallada (con la lista de especies y la ubicación que figura en la unidad GPS) dentro de la bolsa externa y cerrar herméticamente. Colocar inmediatamente en hielo para reducir la actividad de los invertebrados.</p>                                                                                                                                                                                                                                                                                                                                            |
| <p>7) Tan pronto como sea posible, trasladar las muestras a un congelador hasta su envío al laboratorio.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Precauciones:</b> Asegurarse de que los invertebrados se manipulen siempre con guantes y preferiblemente con ningún objeto de metal (para análisis de metales). Cambiar de guantes entre muestras.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p><b>Ubicaciones de muestreo:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>1) Seleccionar de cinco a diez (5-10) ubicaciones para el muestreo en el área del lugar del proyecto. Las ubicaciones deberán ser seleccionadas para que reflejen una gradiente de distancia de las actividades existentes de la mina. Duplicar las muestras en todas las ubicaciones.</p>                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>2) Obtener las ubicaciones que figuran en la unidad GPS para cada ubicación de muestreo y registrarlas en las etiquetas de las muestras.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>3) Tomar fotografías de cada muestra de invertebrados (en el recipiente o la bandeja, de ser posible, para ver qué tipos de especies están presentes) así como de cada ubicación de la muestra.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>4) Registrar las características del lugar, las especies recogidas, la fecha y las coordenadas que figuran en la unidad GPS en las notas de campo.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Instrucciones de envío:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p>1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.</p> <p>2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar el intento de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar.</p> <p>3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>“SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN”</b>. Se deberá añadir un valor nominal de \$20 en el formulario de declaración.</p> |
| <p><b>Formulario de la cadena de custodia:</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>1) Llenar el formulario adjunto de la cadena de custodia y <u>enviar este formulario con las muestras</u>.</p> <p>2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b>“Muestras de invertebrados. Refrigerar y comunicarse con Adrian deBruyn/Audrey Wagenaar, Golder Associates Burnaby, 604-296-4200 para obtener instrucciones para los análisis”</b>.</p> <p>3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn antes del envío de muestras.</p>                                                                                                                                                             |



**Envío:**

Enviar las muestras congeladas, embaladas con compresas de hielo, a:

ALS Laboratories  
1988 Triumph Street  
Vancouver, BC  
Canada, V5L 1K5  
Tel: 1-(604)-253-4188 or 1-(800)-665-0243 (línea gratuita)  
Correo electrónico: Vancouver@alsenviro.com

Incluir el formulario de la cadena de custodia con las siguientes instrucciones: ***“Muestras de invertebrados. Refrigerar y comunicarse con Adrian deBruyn/Audrey Wagenaar, Golder Associates Burnaby, 604-296-4200 para obtener instrucciones para los análisis”.***

**Producto(s) del trabajo a ser entregado(s):** abril de 2009.

**Horas-hombre asignadas:** actividad integrada con el muestreo del suelo.

**Subcontratista (de aplicarse):** Ninguno.

**Requisitos especiales para manipulación:** Mantener la muestra tan fría como sea posible.

**Especificaciones y procedimientos aplicables:** Ninguno.

**Aprobación del Gerente del Proyecto /Fecha:**

**Responsable del Control de Calidad /Fecha:**

## **ANEXO XIX**

### **APÉNDICE A-ix**

#### **INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

#### **MUESTREO DE SUELO Y HOJARASCA PARA ANÁLISIS DE METALES**



**GOLDER ASSOCIATES LTD.**  
**INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                               |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------|
| <b>INSTRUCCIONES ESPECÍFICAS PARA EL TRABAJO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                               | <b>SWI No: 2</b> |
| <b>Línea Base de la EIAS de Petaquilla, Muestreo de Invertebrados en Valle Grande</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                               |                  |
| <b>Fecha:</b> 2 de abril de 2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                               |                  |
| <b>Autor:</b> Adrian deBruyn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Administrador de Tareas:</b> Adrian deBruyn (GAL Burnaby)                                  |                  |
| <b>Para:</b> Darcy Warner (GAL Calgary)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Revisado por:</b> Audrey Wagenaar (Responsable de Disciplina de Administración de Riesgos) |                  |
| <b>cc:</b> Archivo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>No. de expediente:</b>                                                                     |                  |
| <b>Asunto:</b> Muestreo de línea base de suelo y hojarasca para Análisis de Metales en el Área de Estudio de Petaquilla                                                                                                                                                                                                                                                                                                                                                                                       | <b>No. de trabajo/tarea:</b>                                                                  | 07-1334-018/2240 |
| <b>Alcance de las instrucciones específicos/de trabajo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |                  |
| <b>Objetivo:</b> El objetivo del muestreo de suelos y hojarasca es determinar las concentraciones de metales en el sustrato en el que los invertebrados viven. Estos datos serán utilizados para determinar los factores de absorción de metales del sustrato con respecto a los invertebrados.                                                                                                                                                                                                               |                                                                                               |                  |
| <b>Suministros:</b> Bolsas de plástico aptas para alimentos con cierre hermético limpias para muestra (tamaño mediano). Guantes descartables de nitrilo. Botellas de agua. Agua destilada. Detergente suave. Paños limpios tipo J-Cloths. Pala de acero inoxidable de buena calidad (no debería tener ninguna escama de la pintura de recubrimiento en la superficie). Etiquetas preimpresas y etiquetas adicionales. Unidad de sistema de posicionamiento global (GPS). Cooler y compresas de hielo. Cámara. |                                                                                               |                  |
| <b>Instrucciones para el muestreo:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |                  |
| 1) En cada ubicación de muestreo de invertebrados, etiquetar cuatro (4) bolsas de plástico con cierre hermético colocando el número del lugar, la ubicación que figura en la unidad GPS y la fecha. Tomar muestras del área donde se recogieron los invertebrados. Tomar una fotografía en primer plano del lugar de la muestra de suelo.                                                                                                                                                                     |                                                                                               |                  |
| 2) Usar guantes de nitrilo cada vez que haya contacto con el suelo/la hojarasca y cambiar de guantes entre muestras.                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                               |                  |
| 3) Tomar una muestra de hojarasca de la superficie del suelo. Recolectar cualquier invertebrado visible, roca y ramita, pero teniendo cuidado de conservar el material orgánico fino. Llenar dos (2) bolsas de plástico con cierre hermético con hojarasca (una muestra y un duplicado). Tomar por lo menos 3 lampas de hojarasca, mezclándolas bien para obtener muestras compuestas.                                                                                                                        |                                                                                               |                  |
| 4) Tomar una muestra de suelo de los 5 cm superiores después de haber retirado la hojarasca. Llenar dos (2) bolsas de plástico con cierre hermético de ¼ a ½ con tierra (por lo menos 200 g cada una). Tomar por lo menos 3 lampas de tierra, mezclándolas bien para obtener muestras compuestas.                                                                                                                                                                                                             |                                                                                               |                  |
| 5) Sacar el aire de las bolsas y cerrarlas herméticamente. Colocar cada una dentro de otra bolsa de plástico con cierre hermético, colocar una etiqueta de papel dentro de la bolsa externa (con el número del lugar, el contenido de la muestra, la ubicación que figura en la unidad GPS y la fecha) y cerrarlas herméticamente.                                                                                                                                                                            |                                                                                               |                  |
| 6) Entre muestras, limpiar la paleta con una solución detergente. Enjuagar con agua destilada. Secar un con paño limpio tipo J-cloth.                                                                                                                                                                                                                                                                                                                                                                         |                                                                                               |                  |
| 7) De ser posible, mantener las muestras frías hasta que puedan ser trasladadas a un congelador. Mantenerlas congeladas hasta su envío.                                                                                                                                                                                                                                                                                                                                                                       |                                                                                               |                  |
| <b>Precauciones:</b> Asegurarse de que la tierra siempre se manipule con guantes y nunca con objetos de metal (salvo                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                               |                  |

## Notas de Campo e Instrucciones Específicas del Trabajo

|                                                                                                                                                                                                                                                                       |
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| que hayan sido lavados minuciosamente). Cambiar de guantes entre muestras.                                                                                                                                                                                            |
| <b>Ubicaciones de muestreo:</b>                                                                                                                                                                                                                                       |
| 1) Tomar una muestra (más el duplicado) del suelo y una muestra (más el duplicado) de hojarasca en cada ubicación de muestreo de invertebrados.                                                                                                                       |
| 2) Obtener las ubicaciones que figuran en la unidad GPS para cada ubicación de muestreo y registrarlas en las etiquetas de las muestras.                                                                                                                              |
| 3) Tomar fotografías de cada muestra de suelo y hojarasca, así como de cada ubicación de muestreo.                                                                                                                                                                    |
| 4) Registrar las características del lugar, las observaciones de la composición del suelo/hojarasca, la fecha y las coordenadas que figuran en la unidad GPS en las notas de campo.                                                                                   |
| <b>Instrucciones de envío</b>                                                                                                                                                                                                                                         |
| 1) El envío de muestras deberá iniciarse el día lunes para facilitar su recepción en Vancouver antes del fin de semana.                                                                                                                                               |
| 2) Se debe otorgar un plazo de entrega de 3 días al equipo del proyecto HHERA en Vancouver para notificar el intento de envío de las muestras. Toda la correspondencia relacionada con el envío de las muestras deberá enviarse a Adrian de Bruyn y Audrey Wagenaar.  |
| 3) Se debe indicar claramente en el formulario de declaración de entrada lo siguiente: <b>“SIN VALOR COMERCIAL – NO ES PARA CONSUMO. ÚNICAMENTE PARA FINES DE INVESTIGACIÓN”</b> . Se deberá añadir un valor nominal de \$20 en el formulario de declaración.         |
| <b>Formulario de la cadena de custodia:</b>                                                                                                                                                                                                                           |
| 1) Llenar el formulario adjunto de la cadena de custodia y <u>enviar este formulario con las muestras</u> .                                                                                                                                                           |
| 2) La cadena de custodia debe contener las siguientes instrucciones escritas: <b>“Muestras de invertebrados. Refrigerar y comunicarse con Adrian deBruyn/Audrey Wagenaar, Golder Associates Burnaby, 604-296-4200 para obtener instrucciones para los análisis”</b> . |
| 3) Enviar una copia de la cadena de custodia a Audrey Wagenaar y Adrian de Bruyn antes del envío de muestras.                                                                                                                                                         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Envío:</b><br>Enviar las muestras congeladas, embaladas con compresas de hielo, a:<br><br>ALS Laboratories<br>1988 Triumph Street<br>Vancouver, BC<br>Canadá, V5L 1K5<br>Tel: 1-(604)-253-4188 o 1-(800)-665-0243 (línea gratuita)<br>Correo electrónico: Vancouver@alsenviro.com<br><br><u>Incluir el formulario de la cadena de custodia con las siguientes instrucciones: “Muestras de invertebrados. Refrigerar y comunicarse con Adrian deBruyn/Audrey Wagenaar, Golder Associates Burnaby, 604-296-4200 para obtener instrucciones para los análisis”.</u> |
| <b>Producto(s) del trabajo a ser entregado(s):</b> abril de 2009.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Horas-hombre asignadas:</b> por definir                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Subcontratista (de aplicarse):</b> Ninguno.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Requerimientos especiales para manipulación:</b> mantener las muestras lo más frías posibles                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Especificaciones y procedimientos aplicables:</b> Ninguno.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Aprobación del Gerente de Proyecto /Fecha:</b> <span style="float: right;"><b>Responsable del Control de Calidad /Fecha:</b></span>                                                                                                                                                                                                                                                                                                                                                                                                                              |

**ANEXO XIX**  
**APÉNDICE B**  
**Informes del Laboratorio**

**Enviado a:**  
**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

## 1 ASEGURAMIENTO DE LA CALIDAD/ CONTROL DE CALIDAD (QA/QC)

El programa de Aseguramiento de la Calidad y Control de Calidad (QA/QC) de Golder se aplicó con el fin de obtener datos analíticos considerados como interpretables, significativos y reproducibles. En el QA/QC concerniente al laboratorio se incluyó el análisis de métodos de blanqueo y duplicados de muestras de control del laboratorio. Los siguientes criterios se consideraron como aceptables para las muestras de QA/QC del laboratorio:

- los blanqueos analíticos deberán estar por debajo de los límites de detección utilizados para el análisis específico;
- las diferencias porcentuales relativas entre las mismas muestras duplicadas deberá estar dentro del 20%; y
- los análisis se efectuaron utilizando métodos certificados por la *Canadian Association for Laboratory Accreditation (CALA)*.

En las siguientes secciones se describe los resultados de la evaluación de QA/QC para los diversos medios evaluados.

### 1.1 TEJIDO DE LOS PECES

Los resultados de QA/QC del laboratorio se incluyen en los certificados del laboratorio ALS en el Anexo XIX, Apéndice B-i. El programa de QA/QC del laboratorio para el tejido de peces incluyó el análisis de métodos de blanqueo y muestras de control del laboratorio y los resultados de las muestras cumplieron con los criterios del laboratorio en lo que se refiere a precisión, exactitud y blanqueos del laboratorio con las siguientes excepciones:

- Las diferencias porcentuales relativas entre las muestras duplicadas por lo general estuvieron por debajo de los objetivos de calidad de los datos con unas pocas excepciones. Las diferencias se atribuyen a la heterogeneidad de la muestra y los resultados aún se consideran confiables.
- La recuperación del material de referencia estuvo por debajo de los objetivos de calidad de los datos para algunos analitos. Los resultados no detectados se consideraron confiables y los resultados detectados se calificaron.
- Los límites de detección para algunos pesticidas organoclorados y naftalina se consideran elevados en algunas muestras debido a la interferencia de la matriz.
- Algunos metales y PAH se detectaron según el método de blanqueo en concentraciones cercanas al límite de detección. Para estos parámetros el límite de

reporte se ajustó en muestras con detecciones positivas por debajo de cinco veces el nivel de blanqueo.

## 1.2 DATOS DE SUELOS Y CULTIVOS

Los resultados de QA/QC del laboratorio se incluyen en los certificados de *ALS Laboratory* en el Anexo XIX, Apéndice B-i. El programa de QA/QC del laboratorio para los datos de suelo y cultivos incluyó el análisis de método de blanqueo y muestras de control del laboratorio y los resultados de las muestras cumplieron con los criterios del laboratorio en lo que se refiere a precisión, exactitud y blanqueos del laboratorio con las siguientes excepciones:

- La diferencia porcentual relativa entre las muestras duplicadas estuvieron por debajo de los objetivos de calidad de los datos con excepción del zinc. Los resultados se consideran confiables y la alta diferencia porcentual relativa (DPR) se atribuye a la heterogeneidad de las muestras.
- La recuperación del material de referencia no cumplió con los objetivos de calidad de los datos para algunos metales, entre los que se incluyen bario, manganeso, titanio y berilio. Las muestras por debajo del límite de detección se consideraron confiables y otros resultados si se reportaron, se calificaron.
- Algunos metales se detectaron según el método de blanqueo por encima de los límites de detección. El límite de reporte se ajustó en muestras con detecciones positivas por debajo de cinco veces el nivel de blanqueo.

## 1.3 INVERTEBRADOS TERRESTRES

Los resultados de QA/QC del laboratorio se incluyen en los certificados de *ALS Laboratory* en el Anexo XIX, Apéndice B-i. El programa de QA/QC del laboratorio para los datos de suelo y hojarasca incluyó el análisis de método de blanqueo y muestras de control del laboratorio y los resultados de las muestras cumplieron con los criterios del laboratorio en lo que se refiere a precisión, exactitud y blanqueos del laboratorio con sólo una excepción. La recuperación del material de referencia para el titanio y el cobre estuvo ligeramente por encima de los objetivos de calidad de los datos, y en el caso del cromo estuvo ligeramente por debajo. Las muestras con resultados por debajo del límite de detección se consideraron confiables y otros resultados si se reportaron, se cuantificaron.



**ANEXO XIX,**  
**APÉNDICE B-i**  
**CERTIFICADOS DEL LABORATORIO ALS**



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.

ATTN: ADRIAN DE BRUYN

#300-10525-170 STREET

EDMONTON AB T5P 4W2

Report Date: 06-MAY-09 11:15 (MT)

Version: FINAL REV. 2

Lab Work Order #: **L584322**

Date Received: **05-DEC-07**

Project P.O. #:

Job Reference: PANAMA FISH

Legal Site Desc:

CofC Numbers:

Other Information:

**Comments:**

May 6, 2009 - Boron and Silver data has been added for the tissue samples in this report. All other data remains unchanged.

Amber Springer  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L584322-1<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-A | L584322-2<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-B | L584322-3<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-C | L584322-4<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-D | L584322-7<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-A |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Grouping                                                              | Analyte                           |                                                              |                                                              |                                                              |                                                              |                                                             |
| TISSUE                                                                |                                   |                                                              |                                                              |                                                              |                                                              |                                                             |
| Physical Tests                                                        | % Moisture (%)                    | 72.7                                                         | 73.6                                                         | 69.1                                                         | 71.0                                                         | 74.4                                                        |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 186                                                          | <20                                                          | 71                                                           | 46                                                           | 59                                                          |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 50.8                                                         | <4.0                                                         | 22.0                                                         | 13.3                                                         | 15.1                                                        |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050                                                       | <0.10                                                        | <0.10                                                        | <0.10                                                        | <0.10                                                       |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                      |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050                                                       | <0.10                                                        | <0.10                                                        | <0.10                                                        | <0.10                                                       |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                      |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 16.7                                                         | 12.4                                                         | 11.3                                                         | 9.98                                                         | 13.0                                                        |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 4.55                                                         | 3.26                                                         | 3.50                                                         | 2.90                                                         | 3.33                                                        |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                                                        | <0.60                                                        | <0.60                                                        | <0.60                                                        | <0.60                                                       |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                       |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                                                        | <0.60                                                        | <0.60                                                        | <0.60                                                        | <0.60                                                       |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                      |
|                                                                       | Boron (B)-Total (mg/kg)           | 18                                                           | <20                                                          | <20                                                          | 25                                                           | 31                                                          |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 4.9                                                          | 5.2                                                          | <4.0                                                         | 7.1                                                          | 8.0                                                         |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.189                                                        | 0.238                                                        | 0.223                                                        | 0.210                                                        | 0.431                                                       |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0515                                                       | 0.063                                                        | 0.069                                                        | 0.061                                                        | 0.110                                                       |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 43400                                                        | 45900                                                        | 37500                                                        | 44400                                                        | 50800                                                       |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 11800                                                        | 12100                                                        | 11600                                                        | 12900                                                        | 13000                                                       |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 1.10                                                         | <1.0                                                         | <1.0                                                         | 1.3                                                          | <1.0                                                        |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.30                                                         | 0.22                                                         | 0.22                                                         | 0.38                                                         | <0.20                                                       |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                       |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020                                                       | <0.040                                                       | <0.040                                                       | <0.040                                                       | <0.040                                                      |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 1.86                                                         | 2.47                                                         | 1.87                                                         | 1.87                                                         | 3.13                                                        |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.507                                                        | 0.652                                                        | 0.577                                                        | 0.543                                                        | 0.800                                                       |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 1.53                                                         | 0.88                                                         | 1.45                                                         | 2.13                                                         | 4.47                                                        |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.417                                                        | 0.233                                                        | 0.447                                                        | 0.619                                                        | 1.14                                                        |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                                                        | <1.0                                                         | <1.0                                                         | <1.0                                                         | <1.0                                                        |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                       |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1550                                                         | 1590                                                         | 1420                                                         | 1580                                                         | 1850                                                        |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 422                                                          | 420                                                          | 438                                                          | 459                                                          | 473                                                         |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 43.4                                                         | 58.8                                                         | 43.3                                                         | 45.7                                                         | 63.9                                                        |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 11.8                                                         | 15.5                                                         | 13.4                                                         | 13.3                                                         | 16.3                                                        |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0660                                                       | 0.110                                                        | 0.0353                                                       | 0.0642                                                       | 0.0503                                                      |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0180                                                       | 0.0290                                                       | 0.0109                                                       | 0.0186                                                       | 0.0129                                                      |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.187                                                        | 0.11                                                         | 0.13                                                         | 0.22                                                         | <0.10                                                       |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.051                                                        | 0.030                                                        | 0.040                                                        | 0.063                                                        | <0.020                                                      |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 0.52                                                         | <1.0                                                         | <1.0                                                         | <1.0                                                         | <1.0                                                        |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.14                                                         | <0.20                                                        | <0.20                                                        | 0.24                                                         | <0.20                                                       |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.69                                                         | 1.00                                                         | 0.40                                                         | 0.50                                                         | 1.66                                                        |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L584322-8<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-B | L584322-9<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-C | L584322-10<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-D | L584322-11<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-E | L584322-12<br>WHOLE FISH<br>26-SEP-07<br><br>SP1 GUABINA<br>HSJ1 |
|-----------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                                                              | Analyte                           |                                                             |                                                             |                                                              |                                                              |                                                                  |
| TISSUE                                                                |                                   |                                                             |                                                             |                                                              |                                                              |                                                                  |
| Physical Tests                                                        | % Moisture (%)                    | 73.5                                                        | 80.6                                                        | 73.4                                                         | 74.8                                                         | 77.8                                                             |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | <20                                                         | 34                                                          | 16                                                           | <20                                                          | 26                                                               |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | <4.0                                                        | 6.5                                                         | 4.2                                                          | 4.2                                                          | 5.8                                                              |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10                                                       | <0.10                                                       | <0.050                                                       | <0.10                                                        | <0.050                                                           |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.020                                                      | <0.020                                                      | <0.010                                                       | <0.020                                                       | <0.010                                                           |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.10                                                       | 0.15                                                        | 0.091                                                        | <0.10                                                        | 0.436                                                            |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.020                                                      | 0.028                                                       | 0.024                                                        | <0.020                                                       | 0.097                                                            |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 29.4                                                        | 18.2                                                        | 15.1                                                         | 17.2                                                         | 18.7                                                             |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 7.82                                                        | 3.52                                                        | 4.00                                                         | 4.35                                                         | 4.14                                                             |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60                                                       | <0.60                                                       | <0.30                                                        | <0.60                                                        | <0.30                                                            |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.20                                                       | <0.20                                                       | <0.10                                                        | <0.20                                                        | <0.10                                                            |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60                                                       | <0.60                                                       | <0.30                                                        | <0.60                                                        | <0.30                                                            |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.060                                                      | <0.060                                                      | <0.030                                                       | <0.060                                                       | <0.030                                                           |
|                                                                       | Boron (B)-Total (mg/kg)           | <20                                                         | 51                                                          | 32                                                           | 33                                                           | 43                                                               |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | <4.0                                                        | 9.9                                                         | 8.6                                                          | 8.4                                                          | 9.5                                                              |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.382                                                       | 0.698                                                       | 0.359                                                        | 0.633                                                        | 0.190                                                            |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.101                                                       | 0.135                                                       | 0.0954                                                       | 0.160                                                        | 0.0423                                                           |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 56900                                                       | 72500                                                       | 48800                                                        | 60900                                                        | 56000                                                            |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 15100                                                       | 14000                                                       | 13000                                                        | 15400                                                        | 12400                                                            |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 2.7                                                         | <1.0                                                        | 1.26                                                         | <1.0                                                         | 1.85                                                             |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.73                                                        | <0.20                                                       | 0.33                                                         | <0.20                                                        | 0.41                                                             |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.20                                                       | <0.20                                                       | <0.10                                                        | <0.20                                                        | 0.18                                                             |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.040                                                      | <0.040                                                      | <0.020                                                       | <0.040                                                       | 0.040                                                            |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 3.13                                                        | 4.53                                                        | 3.59                                                         | 3.70                                                         | 3.34                                                             |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.830                                                       | 0.877                                                       | 0.955                                                        | 0.934                                                        | 0.742                                                            |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 7.78                                                        | 11.2                                                        | 8.51                                                         | 5.73                                                         | 0.11                                                             |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 2.06                                                        | 2.16                                                        | 2.26                                                         | 1.45                                                         | 0.025                                                            |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0                                                        | <1.0                                                        | <0.50                                                        | <1.0                                                         | <0.50                                                            |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.20                                                       | <0.20                                                       | <0.10                                                        | <0.20                                                        | <0.10                                                            |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 2130                                                        | 2510                                                        | 1620                                                         | 1990                                                         | 2020                                                             |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 566                                                         | 485                                                         | 431                                                          | 502                                                          | 447                                                              |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 85.4                                                        | 109                                                         | 89.5                                                         | 125                                                          | 20.7                                                             |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 22.7                                                        | 21.2                                                        | 23.8                                                         | 31.7                                                         | 4.60                                                             |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.123                                                       | 0.108                                                       | 0.0888                                                       | 0.0755                                                       | 0.140                                                            |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0326                                                      | 0.0209                                                      | 0.0236                                                       | 0.0191                                                       | 0.0311                                                           |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.10                                                       | <0.10                                                       | 0.059                                                        | 0.12                                                         | 0.325                                                            |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | <0.020                                                      | <0.020                                                      | 0.016                                                        | 0.030                                                        | 0.072                                                            |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <1.0                                                        | <1.0                                                        | <0.50                                                        | <1.0                                                         | 0.98                                                             |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | <0.20                                                       | <0.20                                                       | <0.10                                                        | <0.20                                                        | 0.22                                                             |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 1.28                                                        | 2.89                                                        | 1.89                                                         | 1.73                                                         | 3.15                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L584322-13<br>WHOLE FISH<br>26-SEP-07<br><br>BRYCON SP2<br>HSJ1 | L584322-14<br>WHOLE FISH<br>19-SEP-07<br><br>SEPTIA BRYCON<br>SP#1 H3/W3 | L584322-15<br>WHOLE FISH<br>21-SEP-07<br><br>GUABINA HU2A | L584322-16<br>WHOLE FISH<br>17-SEP-07<br><br>BRYCON SP#1<br>H5/W5 |  |
|-----------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------|--|
| Grouping                                                              | Analyte                           |                                                                 |                                                                          |                                                           |                                                                   |  |
| TISSUE                                                                |                                   |                                                                 |                                                                          |                                                           |                                                                   |  |
| Physical Tests                                                        | % Moisture (%)                    | 76.3                                                            | 73.0                                                                     | 73.4                                                      | 72.8                                                              |  |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 36                                                              | 21                                                                       | 25                                                        | 16                                                                |  |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 8.5                                                             | 5.7                                                                      | 6.7                                                       | 4.4                                                               |  |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10                                                           | <0.10                                                                    | <0.10                                                     | <0.050                                                            |  |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.020                                                          | <0.020                                                                   | <0.020                                                    | <0.010                                                            |  |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.10                                                           | <0.10                                                                    | <0.10                                                     | <0.050                                                            |  |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.020                                                          | <0.020                                                                   | <0.020                                                    | <0.010                                                            |  |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 16.4                                                            | 13.4                                                                     | 10.0                                                      | 4.34                                                              |  |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 3.89                                                            | 3.62                                                                     | 2.67                                                      | 1.18                                                              |  |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60                                                           | <0.60                                                                    | <0.60                                                     | <0.30                                                             |  |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.20                                                           | <0.20                                                                    | <0.20                                                     | <0.10                                                             |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60                                                           | <0.60                                                                    | <0.60                                                     | <0.30                                                             |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.060                                                          | <0.060                                                                   | <0.060                                                    | <0.030                                                            |  |
|                                                                       | Boron (B)-Total (mg/kg)           | 21                                                              | 42                                                                       | 21                                                        | 18                                                                |  |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 5.1                                                             | 11.3                                                                     | 5.5                                                       | 5.0                                                               |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.163                                                           | 0.736                                                                    | 0.099                                                     | 0.104                                                             |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.039                                                           | 0.199                                                                    | 0.026                                                     | 0.0283                                                            |  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 83000                                                           | 49500                                                                    | 49000                                                     | 22600                                                             |  |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 19700                                                           | 13400                                                                    | 13000                                                     | 6170                                                              |  |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 1.2                                                             | 2.1                                                                      | <1.0                                                      | <0.50                                                             |  |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.29                                                            | 0.56                                                                     | 0.20                                                      | <0.10                                                             |  |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.27                                                            | <0.20                                                                    | 0.55                                                      | <0.10                                                             |  |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.064                                                           | <0.040                                                                   | 0.146                                                     | <0.020                                                            |  |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 1.95                                                            | 2.35                                                                     | 1.85                                                      | 3.38                                                              |  |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.462                                                           | 0.636                                                                    | 0.494                                                     | 0.921                                                             |  |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 1.73                                                            | 0.44                                                                     | <0.20                                                     | 0.14                                                              |  |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.410                                                           | 0.120                                                                    | 0.051                                                     | 0.038                                                             |  |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0                                                            | <1.0                                                                     | <1.0                                                      | <0.50                                                             |  |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.20                                                           | <0.20                                                                    | <0.20                                                     | <0.10                                                             |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 2270                                                            | 1820                                                                     | 1640                                                      | 1200                                                              |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 540                                                             | 492                                                                      | 437                                                       | 328                                                               |  |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 91.7                                                            | 41.3                                                                     | 90.3                                                      | 10.5                                                              |  |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 21.8                                                            | 11.2                                                                     | 24.1                                                      | 2.87                                                              |  |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0526                                                          | 0.0431                                                                   | 0.0430                                                    | 0.0089                                                            |  |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0125                                                          | 0.0117                                                                   | 0.0115                                                    | 0.0024                                                            |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.10                                                           | 0.25                                                                     | <0.10                                                     | <0.050                                                            |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | <0.020                                                          | 0.069                                                                    | <0.020                                                    | 0.012                                                             |  |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <1.0                                                            | 1.4                                                                      | <1.0                                                      | <0.50                                                             |  |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | <0.20                                                           | 0.37                                                                     | <0.20                                                     | <0.10                                                             |  |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.78                                                            | 0.54                                                                     | 0.78                                                      | 0.49                                                              |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L584322-1<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-A | L584322-2<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-B | L584322-3<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-C | L584322-4<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-D | L584322-7<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-A |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Grouping                                                              | Analyte                           |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>TISSUE</b>                                                         |                                   |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.189                                                        | 0.265                                                        | 0.123                                                        | 0.145                                                        | 0.425                                                       |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                      |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                      |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 209                                                          | 153                                                          | 131                                                          | 115                                                          | 164                                                         |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 56.9                                                         | 40.5                                                         | 40.4                                                         | 33.3                                                         | 42.0                                                        |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                       | <0.060                                                      |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                      |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20                                                        | <0.40                                                        | <0.40                                                        | <0.40                                                        | <0.40                                                       |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                                                       | <0.10                                                        | <0.10                                                        | <0.10                                                        | <0.10                                                       |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                       | <0.020                                                      |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                                                      | <0.0040                                                      | <0.0040                                                      | <0.0040                                                      | <0.0040                                                     |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50                                                        | <1.0                                                         | <1.0                                                         | <1.0                                                         | <1.0                                                        |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                                        | <0.20                                                        | <0.20                                                        | <0.20                                                        | 0.23                                                        |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 96.3                                                         | 120                                                          | 72.4                                                         | 97.6                                                         | 145                                                         |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 26.3                                                         | 31.6                                                         | 22.4                                                         | 28.3                                                         | 37.0                                                        |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Acenaphthylene (mg/kg)            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Anthracene (mg/kg)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Anthracene (mg/kg wwt)            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Chrysene (mg/kg)                  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Chrysene (mg/kg wwt)              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Fluoranthene (mg/kg)              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Fluorene (mg/kg)                  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Fluorene (mg/kg wwt)              |                                                              |                                                              |                                                              |                                                              |                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L584322-8<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-B | L584322-9<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-C | L584322-10<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-D | L584322-11<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-E | L584322-12<br>WHOLE FISH<br>26-SEP-07<br><br>SP1 GUABINA<br>HSJ1 |
|-----------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                                                              | Analyte                           |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>TISSUE</b>                                                         |                                   |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.341                                                       | 0.558                                                       | 0.503                                                        | 0.437                                                        | 0.698                                                            |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.060                                                      | <0.060                                                      | <0.030                                                       | <0.060                                                       | <0.030                                                           |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.020                                                      | <0.020                                                      | <0.010                                                       | <0.020                                                       | <0.010                                                           |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 256                                                         | 243                                                         | 183                                                          | 198                                                          | 185                                                              |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 67.9                                                        | 47.0                                                        | 48.5                                                         | 49.9                                                         | 40.9                                                             |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.060                                                      | <0.060                                                      | <0.030                                                       | <0.060                                                       | <0.030                                                           |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.020                                                      | <0.020                                                      | <0.010                                                       | <0.020                                                       | <0.010                                                           |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.40                                                       | <0.40                                                       | <0.20                                                        | <0.40                                                        | 0.25                                                             |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.10                                                       | <0.10                                                       | <0.050                                                       | <0.10                                                        | 0.056                                                            |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.020                                                      | <0.020                                                      | <0.010                                                       | <0.020                                                       | <0.010                                                           |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0040                                                     | <0.0040                                                     | <0.0020                                                      | <0.0040                                                      | <0.0020                                                          |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <1.0                                                        | <1.0                                                        | 0.67                                                         | 1.2                                                          | <0.50                                                            |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.20                                                       | <0.20                                                       | 0.18                                                         | 0.29                                                         | <0.10                                                            |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 141                                                         | 215                                                         | 131                                                          | 170                                                          | 90.2                                                             |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 37.4                                                        | 41.7                                                        | 34.9                                                         | 42.8                                                         | 20.0                                                             |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Acenaphthylene (mg/kg)            |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Anthracene (mg/kg)                |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Anthracene (mg/kg wwt)            |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Chrysene (mg/kg)                  |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Chrysene (mg/kg wwt)              |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Fluoranthene (mg/kg)              |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Fluorene (mg/kg)                  |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Fluorene (mg/kg wwt)              |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                  | L584322-13<br>WHOLE FISH<br>26-SEP-07<br><br>BRYCON SP2<br>HSJ1 | L584322-14<br>WHOLE FISH<br>19-SEP-07<br><br>SEPTIA BRYCON<br>SP#1 H3/W3 | L584322-15<br>WHOLE FISH<br>21-SEP-07<br><br>GUABINA HU2A | L584322-16<br>WHOLE FISH<br>17-SEP-07<br><br>BRYCON SP#1<br>H5/W5 |  |
|-----------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------|--|
| Grouping                                                              | Analyte                          |                                                                 |                                                                          |                                                           |                                                                   |  |
| <b>TISSUE</b>                                                         |                                  |                                                                 |                                                                          |                                                           |                                                                   |  |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg ww)   | 0.185                                                           | 0.147                                                                    | 0.208                                                     | 0.133                                                             |  |
|                                                                       | Silver (Ag)-Total (mg/kg)        | <0.060                                                          | <0.060                                                                   | <0.060                                                    | <0.030                                                            |  |
|                                                                       | Silver (Ag)-Total (mg/kg ww)     | <0.020                                                          | <0.020                                                                   | <0.020                                                    | <0.010                                                            |  |
|                                                                       | Strontium (Sr)-Total (mg/kg)     | 182                                                             | 179                                                                      | 109                                                       | 46.7                                                              |  |
|                                                                       | Strontium (Sr)-Total (mg/kg ww)  | 43.1                                                            | 48.4                                                                     | 29.1                                                      | 12.7                                                              |  |
|                                                                       | Thallium (Tl)-Total (mg/kg)      | <0.060                                                          | <0.060                                                                   | <0.060                                                    | <0.030                                                            |  |
|                                                                       | Thallium (Tl)-Total (mg/kg ww)   | <0.020                                                          | <0.020                                                                   | <0.020                                                    | <0.010                                                            |  |
|                                                                       | Tin (Sn)-Total (mg/kg)           | <0.40                                                           | <0.40                                                                    | <0.40                                                     | <0.20                                                             |  |
|                                                                       | Tin (Sn)-Total (mg/kg ww)        | <0.10                                                           | <0.10                                                                    | <0.10                                                     | <0.050                                                            |  |
|                                                                       | Uranium (U)-Total (mg/kg)        | <0.020                                                          | <0.020                                                                   | <0.020                                                    | <0.010                                                            |  |
|                                                                       | Uranium (U)-Total (mg/kg ww)     | <0.0040                                                         | <0.0040                                                                  | <0.0040                                                   | <0.0020                                                           |  |
|                                                                       | Vanadium (V)-Total (mg/kg)       | 1.8                                                             | <1.0                                                                     | 1.5                                                       | <0.50                                                             |  |
|                                                                       | Vanadium (V)-Total (mg/kg ww)    | 0.43                                                            | <0.20                                                                    | 0.39                                                      | <0.10                                                             |  |
|                                                                       | Zinc (Zn)-Total (mg/kg)          | 120                                                             | 92.2                                                                     | 108                                                       | 70.5                                                              |  |
|                                                                       | Zinc (Zn)-Total (mg/kg ww)       | 28.4                                                            | 24.9                                                                     | 28.8                                                      | 19.2                                                              |  |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)             | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Acenaphthene (mg/kg ww)          | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Acenaphthylene (mg/kg)           | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Acenaphthylene (mg/kg ww)        | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Anthracene (mg/kg)               | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Anthracene (mg/kg ww)            | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Benz(a)anthracene (mg/kg)        | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Benz(a)anthracene (mg/kg ww)     | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Benzo(a)pyrene (mg/kg)           | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Benzo(a)pyrene (mg/kg ww)        | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg)     | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg ww)  | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)     | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg ww)  | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg)     | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg ww)  | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Chrysene (mg/kg)                 | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Chrysene (mg/kg ww)              | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg ww) | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Fluoranthene (mg/kg)             | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Fluoranthene (mg/kg ww)          | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Fluorene (mg/kg)                 | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Fluorene (mg/kg ww)              | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L584322-1<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-A | L584322-2<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-B | L584322-3<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-C | L584322-4<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-D | L584322-7<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-A |
|-----------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Grouping                                                              | Analyte                                     |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>TISSUE</b>                                                         |                                             |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Naphthalene (mg/kg)                         |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Phenanthrene (mg/kg)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Pyrene (mg/kg)                              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Pyrene (mg/kg wwt)                          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>Polychlorinated Biphenyls</b>                                      | Surrogate: d8-Naphthalene (SS) (%)          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1016 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1221 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1232 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1242 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1248 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1254 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1260 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1262 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1268 (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Aldrin (mg/kg wwt)                          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | alpha-BHC (mg/kg)                           |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | beta-BHC (mg/kg)                            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                                              |                                                              |                                                              |                                                              |                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L584322-8<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-B | L584322-9<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-C | L584322-10<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-D | L584322-11<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-E | L584322-12<br>WHOLE FISH<br>26-SEP-07<br><br>SP1 GUABINA<br>HSJ1 |
|-----------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                                                              | Analyte                                     |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>TISSUE</b>                                                         |                                             |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Naphthalene (mg/kg)                         |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Phenanthrene (mg/kg)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Pyrene (mg/kg)                              |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Pyrene (mg/kg wwt)                          |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                                             |                                                             |                                                              |                                                              | 78                                                               |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                                             |                                                             |                                                              |                                                              | 77                                                               |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                                             |                                                             |                                                              |                                                              | 63                                                               |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                                             |                                                             |                                                              |                                                              | 78                                                               |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1221 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1232 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1242 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1248 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1254 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1260 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1262 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | PCB-1268 (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                             |                                                             |                                                              |                                                              | <0.25                                                            |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Aldrin (mg/kg wwt)                          |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | alpha-BHC (mg/kg)                           |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | beta-BHC (mg/kg)                            |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                             | Sample ID  | Description | Sampled Date | Client ID                |
|-----------------------------------------|---------------------------------------------|------------|-------------|--------------|--------------------------|
|                                         |                                             | L584322-13 | WHOLE FISH  | 26-SEP-07    | BRYCON SP2 HSJ1          |
|                                         |                                             | L584322-14 | WHOLE FISH  | 19-SEP-07    | SEPTIA BRYCON SP#1 H3/W3 |
|                                         |                                             | L584322-15 | WHOLE FISH  | 21-SEP-07    | GUABINA HU2A             |
|                                         |                                             | L584322-16 | WHOLE FISH  | 17-SEP-07    | BRYCON SP#1 H5/W5        |
| Grouping                                | Analyte                                     |            |             |              |                          |
| <b>TISSUE</b>                           |                                             |            |             |              |                          |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Indeno(1,2,3-c,d)pyrene (mg/kg)             | <0.050     |             | <0.050       |                          |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         | <0.010     |             | <0.010       |                          |
|                                         | Naphthalene (mg/kg)                         | <0.050     |             | <0.050       |                          |
|                                         | Naphthalene (mg/kg wwt)                     | <0.010     |             | <0.010       |                          |
|                                         | Phenanthrene (mg/kg)                        | <0.050     |             | <0.050       |                          |
|                                         | Phenanthrene (mg/kg wwt)                    | <0.010     |             | <0.010       |                          |
|                                         | Pyrene (mg/kg)                              | <0.050     |             | <0.050       |                          |
|                                         | Pyrene (mg/kg wwt)                          | <0.010     |             | <0.010       |                          |
|                                         | Surrogate: d10-Acenaphthene (SS) (%)        | 64         |             | 81           |                          |
|                                         | Surrogate: d12-Chrysene (SS) (%)            | 69         |             | 80           |                          |
|                                         | Surrogate: d8-Naphthalene (SS) (%)          | 51         |             | 66           |                          |
|                                         | Surrogate: d10-Phenanthrene (SS) (%)        | 68         |             | 82           |                          |
| <b>Polychlorinated Biphenyls</b>        | PCB-1016 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1016 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1221 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1221 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1232 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1232 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1242 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1242 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1248 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1248 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1254 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1254 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1260 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1260 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1262 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1262 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | PCB-1268 (mg/kg)                            | <0.25      |             | <0.25        |                          |
|                                         | PCB-1268 (mg/kg wwt)                        | <0.050     |             | <0.050       |                          |
|                                         | Total Polychlorinated Biphenyls (mg/kg)     | <0.25      |             | <0.25        |                          |
|                                         | Total Polychlorinated Biphenyls (mg/kg wwt) | <0.050     |             | <0.050       |                          |
| <b>Organochlorine Pesticides</b>        | Aldrin (mg/kg)                              | <0.050     |             | <0.050       |                          |
|                                         | Aldrin (mg/kg wwt)                          | <0.010     |             | <0.010       |                          |
|                                         | alpha-BHC (mg/kg)                           | <0.050     |             | <0.050       |                          |
|                                         | alpha-BHC (mg/kg wwt)                       | <0.010     |             | <0.010       |                          |
|                                         | beta-BHC (mg/kg)                            | <0.050     |             | <0.050       |                          |
|                                         | beta-BHC (mg/kg wwt)                        | <0.010     |             | <0.010       |                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L584322-1<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-A | L584322-2<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-B | L584322-3<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-C | L584322-4<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-D | L584322-7<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-A |
|-----------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Grouping                                                              | Analyte                             |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>TISSUE</b>                                                         |                                     |                                                              |                                                              |                                                              |                                                              |                                                             |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | delta-BHC (mg/kg)                   |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | delta-BHC (mg/kg wwt)               |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Dieldrin (mg/kg)                    |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Dieldrin (mg/kg wwt)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan I (mg/kg)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan II (mg/kg)               |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endrin (mg/kg)                      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Endrin (mg/kg wwt)                  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Heptachlor (mg/kg)                  |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Heptachlor (mg/kg wwt)              |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Methoxychlor (mg/kg)                |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Mirex (mg/kg)                       |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Mirex (mg/kg wwt)                   |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | cis-Nonachlor (mg/kg)               |                                                              |                                                              |                                                              |                                                              |                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L584322-8<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-B | L584322-9<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-C | L584322-10<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-D | L584322-11<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-E | L584322-12<br>WHOLE FISH<br>26-SEP-07<br><br>SP1 GUABINA<br>HSJ1 |
|-----------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                                                              | Analyte                             |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>TISSUE</b>                                                         |                                     |                                                             |                                                             |                                                              |                                                              |                                                                  |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | delta-BHC (mg/kg)                   |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | delta-BHC (mg/kg wwt)               |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Dieldrin (mg/kg)                    |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Dieldrin (mg/kg wwt)                |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Endosulfan I (mg/kg)                |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Endosulfan II (mg/kg)               |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Endrin (mg/kg)                      |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Endrin (mg/kg wwt)                  |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Heptachlor (mg/kg)                  |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Heptachlor (mg/kg wwt)              |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Methoxychlor (mg/kg)                |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | Mirex (mg/kg)                       |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |
|                                                                       | Mirex (mg/kg wwt)                   |                                                             |                                                             |                                                              |                                                              | <0.010                                                           |
|                                                                       | cis-Nonachlor (mg/kg)               |                                                             |                                                             |                                                              |                                                              | <0.050                                                           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L584322-13<br>WHOLE FISH<br>26-SEP-07<br><br>BRYCON SP2<br>HSJ1 | L584322-14<br>WHOLE FISH<br>19-SEP-07<br><br>SEPTIA BRYCON<br>SP#1 H3/W3 | L584322-15<br>WHOLE FISH<br>21-SEP-07<br><br>GUABINA HU2A | L584322-16<br>WHOLE FISH<br>17-SEP-07<br><br>BRYCON SP#1<br>H5/W5 |  |
|-----------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------|--|
| Grouping                                                              | Analyte                             |                                                                 |                                                                          |                                                           |                                                                   |  |
| <b>TISSUE</b>                                                         |                                     |                                                                 |                                                                          |                                                           |                                                                   |  |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | delta-BHC (mg/kg)                   | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | delta-BHC (mg/kg wwt)               | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 2,4'-DDD (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 2,4'-DDD (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 4,4'-DDD (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 4,4'-DDD (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 2,4'-DDE (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 2,4'-DDE (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 4,4'-DDE (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 4,4'-DDE (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 2,4'-DDT (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 2,4'-DDT (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | 4,4'-DDT (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | 4,4'-DDT (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Dieldrin (mg/kg)                    | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Dieldrin (mg/kg wwt)                | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Endosulfan I (mg/kg)                | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Endosulfan I (mg/kg wwt)            | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Endosulfan II (mg/kg)               | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Endosulfan II (mg/kg wwt)           | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Endosulfan Sulfate (mg/kg)          | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Endrin (mg/kg)                      | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Endrin (mg/kg wwt)                  | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Heptachlor (mg/kg)                  | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Heptachlor (mg/kg wwt)              | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Heptachlor Epoxide (mg/kg)          | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Methoxychlor (mg/kg)                | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Methoxychlor (mg/kg wwt)            | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Mirex (mg/kg)                       | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Mirex (mg/kg wwt)                   | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | cis-Nonachlor (mg/kg)               | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L584322-1<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-A | L584322-2<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-B | L584322-3<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-C | L584322-4<br>WHOLE FISH<br>19-SEP-07<br><br>BRYCON H1, SP8-D | L584322-7<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-A |
|-----------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|
| Grouping                                                              | Analyte                     |                                                              |                                                              |                                                              |                                                              |                                                             |
| TISSUE                                                                |                             |                                                              |                                                              |                                                              |                                                              |                                                             |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | trans-Nonachlor (mg/kg)     |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Oxychlordane (mg/kg)        |                                                              |                                                              |                                                              |                                                              |                                                             |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                                              |                                                              |                                                              |                                                              |                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L584322-8<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-<br>B | L584322-9<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-<br>C | L584322-10<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-<br>D | L584322-11<br>WHOLE FISH<br>16-SEP-07<br><br>BRYCON SP HP1-<br>E | L584322-12<br>WHOLE FISH<br>26-SEP-07<br><br>SP1 GUABINA<br>HSJ1 |
|-----------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                                                              | Analyte                     |                                                                 |                                                                 |                                                                  |                                                                  |                                                                  |
| TISSUE                                                                |                             |                                                                 |                                                                 |                                                                  |                                                                  |                                                                  |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                                                 |                                                                 |                                                                  |                                                                  | <0.010                                                           |
|                                                                       | trans-Nonachlor (mg/kg)     |                                                                 |                                                                 |                                                                  |                                                                  | <0.050                                                           |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                                                 |                                                                 |                                                                  |                                                                  | <0.010                                                           |
|                                                                       | Oxychlordane (mg/kg)        |                                                                 |                                                                 |                                                                  |                                                                  | <0.050                                                           |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                                                 |                                                                 |                                                                  |                                                                  | <0.010                                                           |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L584322-13<br>WHOLE FISH<br>26-SEP-07<br><br>BRYCON SP2<br>HSJ1 | L584322-14<br>WHOLE FISH<br>19-SEP-07<br><br>SEPTIA BRYCON<br>SP#1 H3/W3 | L584322-15<br>WHOLE FISH<br>21-SEP-07<br><br>GUABINA HU2A | L584322-16<br>WHOLE FISH<br>17-SEP-07<br><br>BRYCON SP#1<br>H5/W5 |  |
|-----------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------|--|
| Grouping                                                              | Analyte                     |                                                                 |                                                                          |                                                           |                                                                   |  |
| TISSUE                                                                |                             |                                                                 |                                                                          |                                                           |                                                                   |  |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | trans-Nonachlor (mg/kg)     | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | trans-Nonachlor (mg/kg wwt) | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |
|                                                                       | Oxychlordane (mg/kg)        | <0.050                                                          |                                                                          |                                                           | <0.050                                                            |  |
|                                                                       | Oxychlordane (mg/kg wwt)    | <0.010                                                          |                                                                          |                                                           | <0.010                                                            |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**AG-DRY-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**AG-WET-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-DRY-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-WET-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-DRY-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MET-WET-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MOISTURE-TISS-VA** Tissue % Moisture in Tissues ASTM METHOD D2974-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Matrix | Test Description                 | Analytical Method Reference(Based On) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------|---------------------------------------|
| <b>OCP1-TDRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270   |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).                                   |        |                                  |                                       |
| <b>OCP1-TWET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270   |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).                                   |        |                                  |                                       |
| <b>PAH-T-DRY-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270         |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. |        |                                  |                                       |
| <b>PAH-T-WET-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270         |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. |        |                                  |                                       |
| <b>PCB-T-DRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082        |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).                                                                                                                              |        |                                  |                                       |
| <b>PCB-T-WET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082        |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).                                                                                                                              |        |                                  |                                       |
| <b>SE-DRY-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                 |
| This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).                                                                                                               |        |                                  |                                       |
| <b>SE-WET-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                 |
| This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).                                                                                                               |        |                                  |                                       |

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location | Laboratory Definition Code | Laboratory Location |
|----------------------------|---------------------|----------------------------|---------------------|
|----------------------------|---------------------|----------------------------|---------------------|

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description                                | Analytical Method Reference(Based On) |
|---------------|--------|-------------------------------------------------|---------------------------------------|
| VA            |        | ALS LABORATORY GROUP -<br>VANCOUVER, BC, CANADA |                                       |

### GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



**Environmental Division**

# ALS Laboratory Group Quality Control Report

Workorder: L584322

Report Date: 06-MAY-09

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Client: GOLDER ASSOCIATES LTD.

#300-10525-170 STREET

EDMONTON AB T5P 4W2

Contact: ADRIAN DE BRUYN

| Test                   | Matrix         | Reference           | Result  | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------|----------------|---------------------|---------|-----------|-----------|-----|--------|-----------|
| <b>HG-DRY-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>           | <b>R625824</b> |                     |         |           |           |     |        |           |
| <b>WG720971-5 CRM</b>  |                | <b>VA-NRC-DOLT3</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 91      |           | %         |     | 85-115 | 29-JAN-08 |
| <b>WG720971-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 91      |           | %         |     | 85-115 | 29-JAN-08 |
| <b>WG720971-3 DUP</b>  |                | <b>L584322-1</b>    |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                | 0.0660              | 0.0648  |           | mg/kg     | 1.7 | 45     | 29-JAN-08 |
| <b>WG720971-1 MB</b>   |                |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0050 |           | mg/kg     |     | 0.005  | 29-JAN-08 |
| <b>WG720971-2 MB</b>   |                |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0050 |           | mg/kg     |     | 0.005  | 29-JAN-08 |
| <b>HG-WET-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>           | <b>R625823</b> |                     |         |           |           |     |        |           |
| <b>WG720971-5 CRM</b>  |                | <b>VA-NRC-DOLT3</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 91      |           | %         |     | 85-115 | 29-JAN-08 |
| <b>WG720971-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 91      |           | %         |     | 85-115 | 29-JAN-08 |
| <b>WG720971-3 DUP</b>  |                | <b>L584322-1</b>    |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                | 0.0180              | 0.0177  |           | mg/kg wwt | 1.7 | 45     | 29-JAN-08 |
| <b>WG720971-1 MB</b>   |                |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg wwt |     | 0.001  | 29-JAN-08 |
| <b>WG720971-2 MB</b>   |                |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg wwt |     | 0.001  | 29-JAN-08 |
| <b>MET-DRY-MS-VA</b>   |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>           | <b>R625974</b> |                     |         |           |           |     |        |           |
| <b>WG720971-5 CRM</b>  |                | <b>VA-NRC-DOLT3</b> |         |           |           |     |        |           |
| Aluminum (Al)-Total    |                |                     | 135     | RM-H      | %         |     | 90-110 | 29-JAN-08 |
| Arsenic (As)-Total     |                |                     | 102     |           | %         |     | 90-110 | 29-JAN-08 |
| Cadmium (Cd)-Total     |                |                     | 105     |           | %         |     | 90-110 | 29-JAN-08 |
| Chromium (Cr)-Total    |                |                     | 92      |           | %         |     | 53-141 | 29-JAN-08 |
| Copper (Cu)-Total      |                |                     | 109     |           | %         |     | 90-110 | 29-JAN-08 |
| Lead (Pb)-Total        |                |                     | 115     | RM-H      | %         |     | 90-110 | 29-JAN-08 |
| Nickel (Ni)-Total      |                |                     | 111     | RM-H      | %         |     | 90-110 | 29-JAN-08 |
| Tin (Sn)-Total         |                |                     | 116     | RM-H      | %         |     | 90-110 | 29-JAN-08 |
| Zinc (Zn)-Total        |                |                     | 117     | RM-H      | %         |     | 90-110 | 29-JAN-08 |
| <b>WG720971-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Arsenic (As)-Total     |                |                     | 103     |           | %         |     | 83-108 | 29-JAN-08 |
| Cadmium (Cd)-Total     |                |                     | 103     |           | %         |     | 91-122 | 29-JAN-08 |

# ALS Laboratory Group Quality Control Report

Workorder: L584322

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD   | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |       |        |           |
| <b>Batch</b>          | <b>R625974</b> |                     |        |           |       |       |        |           |
| <b>WG720971-6</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |       |       |        |           |
| Copper (Cu)-Total     |                |                     | 95     |           | %     |       | 80-108 | 29-JAN-08 |
| Lead (Pb)-Total       |                |                     | 132    |           | %     |       | 67-141 | 29-JAN-08 |
| Manganese (Mn)-Total  |                |                     | 93     |           | %     |       | 81-110 | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |                     | 108    |           | %     |       | 87-115 | 29-JAN-08 |
| Nickel (Ni)-Total     |                |                     | 89     |           | %     |       | 75-109 | 29-JAN-08 |
| Strontium (Sr)-Total  |                |                     | 91     |           | %     |       | 77-111 | 29-JAN-08 |
| Vanadium (V)-Total    |                |                     | 112    |           | %     |       | 90-125 | 29-JAN-08 |
| Zinc (Zn)-Total       |                |                     | 106    |           | %     |       | 84-118 | 29-JAN-08 |
| <b>WG720971-3</b>     | <b>DUP</b>     | <b>L584322-1</b>    |        |           |       |       |        |           |
| Aluminum (Al)-Total   |                | 186                 | 192    |           | mg/kg | 3.3   | 45     | 29-JAN-08 |
| Antimony (Sb)-Total   |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Arsenic (As)-Total    |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Barium (Ba)-Total     |                | 16.7                | 15.6   |           | mg/kg | 6.5   | 45     | 29-JAN-08 |
| Beryllium (Be)-Total  |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Bismuth (Bi)-Total    |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Cadmium (Cd)-Total    |                | 0.189               | 0.185  | J         | mg/kg | 0.004 | 0.12   | 29-JAN-08 |
| Calcium (Ca)-Total    |                | 43400               | 41300  |           | mg/kg | 4.9   | 45     | 29-JAN-08 |
| Chromium (Cr)-Total   |                | 1.10                | 1.26   | J         | mg/kg | 0.16  | 2      | 29-JAN-08 |
| Cobalt (Co)-Total     |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Copper (Cu)-Total     |                | 1.86                | 1.94   |           | mg/kg | 4.0   | 45     | 29-JAN-08 |
| Lead (Pb)-Total       |                | 1.53                | 1.68   |           | mg/kg | 9.3   | 45     | 29-JAN-08 |
| Lithium (Li)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Magnesium (Mg)-Total  |                | 1550                | 1560   |           | mg/kg | 0.90  | 45     | 29-JAN-08 |
| Manganese (Mn)-Total  |                | 43.4                | 41.5   |           | mg/kg | 4.6   | 45     | 29-JAN-08 |
| Molybdenum (Mo)-Total |                | 0.187               | 0.188  | J         | mg/kg | 0.001 | 0.2    | 29-JAN-08 |
| Nickel (Ni)-Total     |                | 0.52                | 0.60   | J         | mg/kg | 0.08  | 2      | 29-JAN-08 |
| Strontium (Sr)-Total  |                | 209                 | 195    |           | mg/kg | 6.9   | 45     | 29-JAN-08 |
| Thallium (Tl)-Total   |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Tin (Sn)-Total        |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Uranium (U)-Total     |                | <0.010              | <0.010 | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Vanadium (V)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 29-JAN-08 |
| Zinc (Zn)-Total       |                | 96.3                | 96.5   |           | mg/kg | 0.26  | 45     | 29-JAN-08 |
| <b>WG720971-1</b>     | <b>MB</b>      |                     |        |           |       |       |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |       | 10     | 29-JAN-08 |

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Workorder: L584322

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| Test                  | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b> |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R625974</b> |               |        |           |       |     |       |           |
| <b>WG720971-1</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 29-JAN-08 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 29-JAN-08 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 29-JAN-08 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 29-JAN-08 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 29-JAN-08 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 29-JAN-08 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 29-JAN-08 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 29-JAN-08 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 29-JAN-08 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| Zinc (Zn)-Total       |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| <b>WG720971-2</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |               | <10    |           | mg/kg |     | 10    | 29-JAN-08 |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 29-JAN-08 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 29-JAN-08 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 29-JAN-08 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 29-JAN-08 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 29-JAN-08 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 29-JAN-08 |

# ALS Laboratory Group Quality Control Report

Workorder: L584322

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R625974</b> |                     |        |           |       |     |        |           |
| <b>WG720971-2</b>     | <b>MB</b>      |                     |        |           |       |     |        |           |
| Lead (Pb)-Total       |                |                     | <0.10  |           | mg/kg |     | 0.1    | 29-JAN-08 |
| Lithium (Li)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 29-JAN-08 |
| Magnesium (Mg)-Total  |                |                     | <3.0   |           | mg/kg |     | 3      | 29-JAN-08 |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg |     | 0.05   | 29-JAN-08 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg |     | 0.5    | 29-JAN-08 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 29-JAN-08 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg |     | 0.03   | 29-JAN-08 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg |     | 0.2    | 29-JAN-08 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg |     | 0.01   | 29-JAN-08 |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 29-JAN-08 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg |     | 0.5    | 29-JAN-08 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R625970</b> |                     |        |           |       |     |        |           |
| <b>WG720971-5</b>     | <b>CRM</b>     | <b>VA-NRC-DOLT3</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 135    | RM-H      | %     |     | 90-110 | 29-JAN-08 |
| Arsenic (As)-Total    |                |                     | 102    |           | %     |     | 90-110 | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |                     | 105    |           | %     |     | 90-110 | 29-JAN-08 |
| Chromium (Cr)-Total   |                |                     | 92     |           | %     |     | 53-141 | 29-JAN-08 |
| Copper (Cu)-Total     |                |                     | 109    |           | %     |     | 90-110 | 29-JAN-08 |
| Lead (Pb)-Total       |                |                     | 115    | RM-H      | %     |     | 90-110 | 29-JAN-08 |
| Nickel (Ni)-Total     |                |                     | 111    | RM-H      | %     |     | 90-110 | 29-JAN-08 |
| Tin (Sn)-Total        |                |                     | 116    | RM-H      | %     |     | 90-110 | 29-JAN-08 |
| Zinc (Zn)-Total       |                |                     | 117    | RM-H      | %     |     | 90-110 | 29-JAN-08 |
| <b>WG720971-6</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Arsenic (As)-Total    |                |                     | 103    |           | %     |     | 83-108 | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |                     | 103    |           | %     |     | 91-122 | 29-JAN-08 |
| Copper (Cu)-Total     |                |                     | 95     |           | %     |     | 80-108 | 29-JAN-08 |
| Lead (Pb)-Total       |                |                     | 132    |           | %     |     | 67-141 | 29-JAN-08 |
| Manganese (Mn)-Total  |                |                     | 93     |           | %     |     | 81-110 | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |                     | 108    |           | %     |     | 87-115 | 29-JAN-08 |
| Nickel (Ni)-Total     |                |                     | 89     |           | %     |     | 75-109 | 29-JAN-08 |
| Strontium (Sr)-Total  |                |                     | 91     |           | %     |     | 77-111 | 29-JAN-08 |
| Vanadium (V)-Total    |                |                     | 112    |           | %     |     | 90-125 | 29-JAN-08 |



# ALS Laboratory Group Quality Control Report

Workorder: L584322

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units    | RPD   | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|----------|-------|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |          |       |        |           |
| <b>Batch</b>          | <b>R625970</b> |                     |         |           |          |       |        |           |
| <b>WG720971-6</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |          |       |        |           |
| Zinc (Zn)-Total       |                |                     | 106     |           | %        |       | 84-118 | 29-JAN-08 |
| <b>WG720971-3</b>     | <b>DUP</b>     | <b>L584322-1</b>    |         |           |          |       |        |           |
| Aluminum (Al)-Total   |                | 50.8                | 52.4    |           | mg/kg ww | 3.3   | 45     | 29-JAN-08 |
| Antimony (Sb)-Total   |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Arsenic (As)-Total    |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Barium (Ba)-Total     |                | 4.55                | 4.26    |           | mg/kg ww | 6.5   | 45     | 29-JAN-08 |
| Beryllium (Be)-Total  |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Bismuth (Bi)-Total    |                | <0.030              | <0.030  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Cadmium (Cd)-Total    |                | 0.0515              | 0.0505  |           | mg/kg ww | 2.1   | 45     | 29-JAN-08 |
| Calcium (Ca)-Total    |                | 11800               | 11300   |           | mg/kg ww | 4.9   | 45     | 29-JAN-08 |
| Chromium (Cr)-Total   |                | 0.30                | 0.34    | J         | mg/kg ww | 0.04  | 0.4    | 29-JAN-08 |
| Cobalt (Co)-Total     |                | <0.020              | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Copper (Cu)-Total     |                | 0.507               | 0.528   |           | mg/kg ww | 4.0   | 45     | 29-JAN-08 |
| Lead (Pb)-Total       |                | 0.417               | 0.457   |           | mg/kg ww | 9.3   | 45     | 29-JAN-08 |
| Lithium (Li)-Total    |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Magnesium (Mg)-Total  |                | 422                 | 425     |           | mg/kg ww | 0.90  | 45     | 29-JAN-08 |
| Manganese (Mn)-Total  |                | 11.8                | 11.3    |           | mg/kg ww | 4.6   | 45     | 29-JAN-08 |
| Molybdenum (Mo)-Total |                | 0.051               | 0.051   | J         | mg/kg ww | 0.000 | 0.04   | 29-JAN-08 |
| Nickel (Ni)-Total     |                | 0.14                | 0.16    | J         | mg/kg ww | 0.02  | 0.4    | 29-JAN-08 |
| Strontium (Sr)-Total  |                | 56.9                | 53.1    |           | mg/kg ww | 6.9   | 45     | 29-JAN-08 |
| Thallium (Tl)-Total   |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Tin (Sn)-Total        |                | <0.050              | <0.050  | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Uranium (U)-Total     |                | <0.0020             | <0.0020 | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Vanadium (V)-Total    |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45     | 29-JAN-08 |
| Zinc (Zn)-Total       |                | 26.3                | 26.3    |           | mg/kg ww | 0.26  | 45     | 29-JAN-08 |
| <b>WG720971-1</b>     | <b>MB</b>      |                     |         |           |          |       |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0    |           | mg/kg ww |       | 2      | 29-JAN-08 |
| Antimony (Sb)-Total   |                |                     | <0.010  |           | mg/kg ww |       | 0.01   | 29-JAN-08 |
| Arsenic (As)-Total    |                |                     | <0.010  |           | mg/kg ww |       | 0.01   | 29-JAN-08 |
| Barium (Ba)-Total     |                |                     | <0.010  |           | mg/kg ww |       | 0.01   | 29-JAN-08 |
| Beryllium (Be)-Total  |                |                     | <0.10   |           | mg/kg ww |       | 0.1    | 29-JAN-08 |
| Bismuth (Bi)-Total    |                |                     | <0.030  |           | mg/kg ww |       | 0.03   | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |                     | <0.0050 |           | mg/kg ww |       | 0.005  | 29-JAN-08 |
| Calcium (Ca)-Total    |                |                     | <2.0    |           | mg/kg ww |       | 2      | 29-JAN-08 |

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R625970</b> |               |         |           |          |     |       |           |
| <b>WG720971-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 29-JAN-08 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 29-JAN-08 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 29-JAN-08 |
| Manganese (Mn)-Total  |                |               | 0.028   | MB-LOR    | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 29-JAN-08 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 29-JAN-08 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| <b>WG720971-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 29-JAN-08 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 29-JAN-08 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 29-JAN-08 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 29-JAN-08 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 29-JAN-08 |
| Copper (Cu)-Total     |                |               | 0.019   | MB-LOR    | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 29-JAN-08 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 29-JAN-08 |
| Manganese (Mn)-Total  |                |               | 0.017   | MB-LOR    | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 29-JAN-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 29-JAN-08 |

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| Test                               | Matrix  | Reference | Result  | Qualifier | Units     | RPD | Limit | Analyzed  |
|------------------------------------|---------|-----------|---------|-----------|-----------|-----|-------|-----------|
| <b>MET-WET-MS-VA Tissue</b>        |         |           |         |           |           |     |       |           |
| Batch                              | R625970 |           |         |           |           |     |       |           |
| WG720971-2                         | MB      |           |         |           |           |     |       |           |
| Thallium (Tl)-Total                |         |           | <0.010  |           | mg/kg wwt |     | 0.01  | 29-JAN-08 |
| Tin (Sn)-Total                     |         |           | <0.050  |           | mg/kg wwt |     | 0.05  | 29-JAN-08 |
| Uranium (U)-Total                  |         |           | <0.0020 |           | mg/kg wwt |     | 0.002 | 29-JAN-08 |
| Vanadium (V)-Total                 |         |           | <0.10   |           | mg/kg wwt |     | 0.1   | 29-JAN-08 |
| Zinc (Zn)-Total                    |         |           | <0.10   |           | mg/kg wwt |     | 0.1   | 29-JAN-08 |
| <b>MOISTURE-TISS-VA Tissue</b>     |         |           |         |           |           |     |       |           |
| Batch                              | R625167 |           |         |           |           |     |       |           |
| WG720970-1                         | DUP     | L584322-1 |         |           |           |     |       |           |
| % Moisture                         |         | 72.7      | 70.1    |           | %         | 3.7 | 30    | 25-JAN-08 |
| <b>OCP1-TDRY-SOX-ECD-VA Tissue</b> |         |           |         |           |           |     |       |           |
| Batch                              | R628636 |           |         |           |           |     |       |           |
| WG722018-1                         | MB      |           |         |           |           |     |       |           |
| alpha-BHC                          |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Lindane (gamma - BHC)              |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| beta-BHC                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| delta-BHC                          |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Heptachlor                         |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Aldrin                             |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Oxychlordane                       |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| 2,4'-DDE                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Heptachlor Epoxide                 |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| trans-Chlordane (gamma)            |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| trans-Nonachlor                    |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| cis-Chlordane (alpha)              |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| 4,4'-DDE                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Endosulfan I                       |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| 2,4'-DDD                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Dieldrin                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| 2,4'-DDT                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Endrin                             |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| cis-Nonachlor                      |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| 4,4'-DDD                           |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Endosulfan II                      |         |           | <0.010  |           | mg/kg     |     | 0.01  | 06-FEB-08 |

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| Test                        | Matrix  | Reference | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|-----------------------------|---------|-----------|--------|-----------|-----------|-----|-------|-----------|
| OCP1-TDRY-SOX-ECD-VA Tissue |         |           |        |           |           |     |       |           |
| Batch                       | R628636 |           |        |           |           |     |       |           |
| WG722018-1                  | MB      |           |        |           |           |     |       |           |
| 4,4'-DDT                    |         |           | <0.010 |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Methoxychlor                |         |           | <0.010 |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Mirex                       |         |           | <0.010 |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| Endosulfan Sulfate          |         |           | <0.010 |           | mg/kg     |     | 0.01  | 06-FEB-08 |
| OCP1-TWET-SOX-ECD-VA Tissue |         |           |        |           |           |     |       |           |
| Batch                       | R628636 |           |        |           |           |     |       |           |
| WG722018-1                  | MB      |           |        |           |           |     |       |           |
| alpha-BHC                   |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Lindane (gamma - BHC)       |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| beta-BHC                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| delta-BHC                   |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Heptachlor                  |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Aldrin                      |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Oxychlordane                |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 2,4'-DDE                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Heptachlor Epoxide          |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| trans-Chlordane (gamma)     |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| trans-Nonachlor             |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| cis-Chlordane (alpha)       |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 4,4'-DDE                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Endosulfan I                |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 2,4'-DDD                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Dieldrin                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 2,4'-DDT                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Endrin                      |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| cis-Nonachlor               |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 4,4'-DDD                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Endosulfan II               |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| 4,4'-DDT                    |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Methoxychlor                |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Mirex                       |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| Endosulfan Sulfate          |         |           | <0.010 |           | mg/kg wwt |     | 0.01  | 06-FEB-08 |
| PAH-T-DRY-SOX-MS-VA Tissue  |         |           |        |           |           |     |       |           |

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| Test                       | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|---------------|--------|-----------|-------|-----|--------|-----------|
| <b>PAH-T-DRY-SOX-MS-VA</b> |                | <b>Tissue</b> |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R628112</b> |               |        |           |       |     |        |           |
| <b>WG722018-1</b>          | <b>MB</b>      |               |        |           |       |     |        |           |
| Acenaphthene               |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Acenaphthylene             |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Anthracene                 |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Benz(a)anthracene          |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Benzo(a)pyrene             |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Benzo(b)fluoranthene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Benzo(g,h,i)perylene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Benzo(k)fluoranthene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Chrysene                   |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Dibenz(a,h)anthracene      |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Fluoranthene               |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Fluorene                   |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Indeno(1,2,3-c,d)pyrene    |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Naphthalene                |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| Phenanthrene               |                |               | 0.073  | MB-LOR    | mg/kg |     | 0.05   | 05-FEB-08 |
| Pyrene                     |                |               | <0.050 |           | mg/kg |     | 0.05   | 05-FEB-08 |
| <b>PAH-T-WET-SOX-MS-VA</b> |                | <b>Tissue</b> |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R628112</b> |               |        |           |       |     |        |           |
| <b>WG722018-2</b>          | <b>LCS</b>     |               |        |           |       |     |        |           |
| Acenaphthene               |                |               | 67     |           | %     |     | 55-145 | 05-FEB-08 |
| Acenaphthylene             |                |               | 67     |           | %     |     | 55-145 | 05-FEB-08 |
| Anthracene                 |                |               | 79     |           | %     |     | 55-145 | 05-FEB-08 |
| Benz(a)anthracene          |                |               | 82     |           | %     |     | 55-145 | 05-FEB-08 |
| Benzo(a)pyrene             |                |               | 83     |           | %     |     | 55-145 | 05-FEB-08 |
| Benzo(b)fluoranthene       |                |               | 83     |           | %     |     | 55-145 | 05-FEB-08 |
| Benzo(g,h,i)perylene       |                |               | 83     |           | %     |     | 55-145 | 05-FEB-08 |
| Benzo(k)fluoranthene       |                |               | 86     |           | %     |     | 55-145 | 05-FEB-08 |
| Chrysene                   |                |               | 84     |           | %     |     | 55-145 | 05-FEB-08 |
| Dibenz(a,h)anthracene      |                |               | 83     |           | %     |     | 55-145 | 05-FEB-08 |
| Fluoranthene               |                |               | 83     |           | %     |     | 55-145 | 05-FEB-08 |
| Fluorene                   |                |               | 70     |           | %     |     | 55-145 | 05-FEB-08 |
| Indeno(1,2,3-c,d)pyrene    |                |               | 79     |           | %     |     | 55-145 | 05-FEB-08 |
| Naphthalene                |                |               | 62     |           | %     |     | 55-145 | 05-FEB-08 |
| Phenanthrene               |                |               | 75     |           | %     |     | 55-145 | 05-FEB-08 |

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| Test                            | Matrix  | Reference | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|---------------------------------|---------|-----------|--------|-----------|----------|-----|--------|-----------|
| PAH-T-WET-SOX-MS-VA             |         | Tissue    |        |           |          |     |        |           |
| Batch                           | R628112 |           |        |           |          |     |        |           |
| WG722018-2                      | LCS     |           |        |           |          |     |        |           |
| Phenanthrene                    |         |           | 75     |           | %        |     | 55-145 | 05-FEB-08 |
| Pyrene                          |         |           | 84     |           | %        |     | 55-145 | 05-FEB-08 |
| WG722018-1                      | MB      |           |        |           |          |     |        |           |
| Acenaphthene                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Acenaphthylene                  |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Anthracene                      |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Benz(a)anthracene               |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Benzo(a)pyrene                  |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Benzo(b)fluoranthene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Benzo(g,h,i)perylene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Benzo(k)fluoranthene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Chrysene                        |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Dibenz(a,h)anthracene           |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Fluoranthene                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Fluorene                        |         |           | <0.020 | MB-LOR    | mg/kg ww |     | 0.02   | 05-FEB-08 |
| Indeno(1,2,3-c,d)pyrene         |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Naphthalene                     |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Phenanthrene                    |         |           | 0.073  | MB-LOR    | mg/kg ww |     | 0.01   | 05-FEB-08 |
| Pyrene                          |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 05-FEB-08 |
| PCB-T-DRY-SOX-ECD-VA            |         | Tissue    |        |           |          |     |        |           |
| Batch                           | R628636 |           |        |           |          |     |        |           |
| WG722018-1                      | MB      |           |        |           |          |     |        |           |
| Total Polychlorinated Biphenyls |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1016                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1221                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1232                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1242                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1248                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1254                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1260                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1262                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| PCB-1268                        |         |           | <0.050 |           | mg/kg    |     | 0.05   | 06-FEB-08 |
| SE-DRY-HVAAS-VA                 |         | Tissue    |        |           |          |     |        |           |

## ALS Laboratory Group Quality Control Report

Workorder: L584322

Report Date: 06-MAY-09

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| Test                   | Matrix         | Reference           | Result | Qualifier | Units     | RPD   | Limit  | Analyzed  |
|------------------------|----------------|---------------------|--------|-----------|-----------|-------|--------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |       |        |           |
| <b>Batch</b>           | <b>R625891</b> |                     |        |           |           |       |        |           |
| <b>WG720971-5 CRM</b>  |                | <b>VA-NRC-DOLT3</b> |        |           |           |       |        |           |
| Selenium (Se)-Total    |                |                     | 99     |           | %         |       | 85-115 | 30-JAN-08 |
| <b>WG720971-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |           |       |        |           |
| Selenium (Se)-Total    |                |                     | 100    |           | %         |       | 83-112 | 30-JAN-08 |
| <b>WG720971-3 DUP</b>  |                | <b>L584322-1</b>    |        |           |           |       |        |           |
| Selenium (Se)-Total    |                | 0.69                | 0.62   | J         | mg/kg     | 0.07  | 0.4    | 30-JAN-08 |
| <b>WG720971-1 MB</b>   |                |                     | <0.10  |           | mg/kg     |       | 0.1    | 30-JAN-08 |
| <b>WG720971-2 MB</b>   |                |                     | <0.10  |           | mg/kg     |       | 0.1    | 30-JAN-08 |
| <b>SE-WET-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |       |        |           |
| <b>Batch</b>           | <b>R625884</b> |                     |        |           |           |       |        |           |
| <b>WG720971-5 CRM</b>  |                | <b>VA-NRC-DOLT3</b> |        |           |           |       |        |           |
| Selenium (Se)-Total    |                |                     | 99     |           | %         |       | 85-115 | 29-JAN-08 |
| <b>WG720971-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |           |       |        |           |
| Selenium (Se)-Total    |                |                     | 100    |           | %         |       | 83-112 | 29-JAN-08 |
| <b>WG720971-3 DUP</b>  |                | <b>L584322-1</b>    |        |           |           |       |        |           |
| Selenium (Se)-Total    |                | 0.189               | 0.169  | J         | mg/kg wwt | 0.020 | 0.08   | 29-JAN-08 |
| <b>WG720971-1 MB</b>   |                |                     | <0.020 |           | mg/kg wwt |       | 0.02   | 29-JAN-08 |
| <b>WG720971-2 MB</b>   |                |                     | 0.023  | MB-LOR    | mg/kg wwt |       | 0.02   | 29-JAN-08 |

## ALS Laboratory Group Quality Control Report

Workorder: L584322

Report Date: 06-MAY-09

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**Legend:**

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

**Sample Parameter Qualifier Definitions:**

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| Qualifier | Description                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                          |
| MB-LOR    | Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required. |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                          |



**Short Holding Time**  
*Rush Processing Required*

IDY / ANALYTICAL REQUEST FORM

CALL FREE 1-800-668-9878

alservivo.com

[illegible]

## GUIDELINES / REGULATIONS

## SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS

# SAMPLES RECEIVED WITHOUT COC

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.

| RELINQUISHED BY: |  | DATE & TIME: | RECEIVED BY: | DATE & TIME: | TEMPERATURE: | SAMPLE CONDITION (lab use only) | SAMPLES RECEIVED IN GOOD CONDITION? YES/NO |
|------------------|--|--------------|--------------|--------------|--------------|---------------------------------|--------------------------------------------|
| [Signature]      |  |              | [Signature]  | 2/5          |              | OK, all intact                  | YES                                        |
| RELINQUISHED BY: |  | DATE & TIME: | RECEIVED BY: | DATE & TIME: |              | 19 OK, still frozen             | YES                                        |

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY PINK - FILE COPY YELLOW - CLIENT COPY

GENF14.00



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.

ATTN: ADRIAN DE BRUYN

195 PEMBERTON AVE

NORTH VANCOUVER BC V7P 2R4

Reported On: 07-NOV-08 06:21 PM

Revision: 4

Lab Work Order #: **L677662**

Date Received: **06-JUN-08**

Project P.O. #:

Job Reference: PANAMA ESTUARINE FISH

Legal Site Desc:

CofC Numbers:

Other Information:

Comments: Detection limits for some Organochloride Pesticides have been increased due to matrix interferences encountered during analysis.

GLENYSS WEEKS  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                  | L677662-1             | L677662-2               | L677662-3                 | L677662-4                    | L677662-5                    |
|-----------------------------------------------------------------------|----------------------------------|-----------------------|-------------------------|---------------------------|------------------------------|------------------------------|
|                                                                       |                                  | 17-MAR-08             | 17-MAR-08               | 16-MAR-08                 | 11-MAR-08                    | 11-MAR-08                    |
|                                                                       |                                  | GUABINA 20CM<br>TL W7 | GUABINA<br>22.4CM TL W7 | GUABINA<br>16.1cm TL SJF1 | CAIMITO 20CM<br>TL "GUABINA" | G. DORMITOR<br>14.4CM TL CF1 |
| Grouping                                                              | Analyte                          |                       |                         |                           |                              |                              |
| TISSUE                                                                |                                  |                       |                         |                           |                              |                              |
| Physical Tests                                                        | % Moisture (%)                   | 76.5                  | 76.9                    | 75.2                      | 76.0                         | 74.6                         |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)      | 118                   | 23                      | 25                        | 25                           | 13                           |
|                                                                       | Aluminum (Al)-Total (mg/kg ww)   | 27.8                  | 5.3                     | 6.1                       | 5.9                          | 3.2                          |
|                                                                       | Antimony (Sb)-Total (mg/kg)      | <0.050                | <0.050                  | <0.050                    | <0.050                       | <0.050                       |
|                                                                       | Antimony (Sb)-Total (mg/kg ww)   | <0.010                | <0.010                  | <0.010                    | <0.010                       | <0.010                       |
|                                                                       | Arsenic (As)-Total (mg/kg)       | 0.929                 | 0.710                   | 0.655                     | 6.01                         | 6.50                         |
|                                                                       | Arsenic (As)-Total (mg/kg ww)    | 0.219                 | 0.164                   | 0.162                     | 1.44                         | 1.65                         |
|                                                                       | Barium (Ba)-Total (mg/kg)        | 25.8                  | 18.1                    | 13.2                      | 27.1                         | 37.8                         |
|                                                                       | Barium (Ba)-Total (mg/kg ww)     | 6.08                  | 4.19                    | 3.26                      | 6.49                         | 9.62                         |
|                                                                       | Beryllium (Be)-Total (mg/kg)     | <0.30                 | <0.30                   | <0.30                     | <0.30                        | <0.30                        |
|                                                                       | Beryllium (Be)-Total (mg/kg ww)  | <0.10                 | <0.10                   | <0.10                     | <0.10                        | <0.10                        |
|                                                                       | Bismuth (Bi)-Total (mg/kg)       | <0.30                 | <0.30                   | <0.30                     | <0.30                        | <0.30                        |
|                                                                       | Bismuth (Bi)-Total (mg/kg ww)    | <0.030                | <0.030                  | <0.030                    | <0.030                       | <0.030                       |
|                                                                       | Cadmium (Cd)-Total (mg/kg)       | 0.108                 | 0.084                   | 0.053                     | 0.183                        | 0.107                        |
|                                                                       | Cadmium (Cd)-Total (mg/kg ww)    | 0.0254                | 0.0194                  | 0.0132                    | 0.0440                       | 0.0271                       |
|                                                                       | Calcium (Ca)-Total (mg/kg)       | 38600                 | 53000                   | 49200                     | 51900                        | 46600                        |
|                                                                       | Calcium (Ca)-Total (mg/kg ww)    | 9080                  | 12200                   | 12200                     | 12400                        | 11800                        |
|                                                                       | Chromium (Cr)-Total (mg/kg)      | 2.51                  | 3.80                    | 1.88                      | 3.50                         | 3.80                         |
|                                                                       | Chromium (Cr)-Total (mg/kg ww)   | 0.59                  | 0.88                    | 0.47                      | 0.84                         | 0.97                         |
|                                                                       | Cobalt (Co)-Total (mg/kg)        | 0.25                  | 0.12                    | 0.12                      | <0.10                        | <0.10                        |
|                                                                       | Cobalt (Co)-Total (mg/kg ww)     | 0.059                 | 0.027                   | 0.031                     | <0.020                       | <0.020                       |
|                                                                       | Copper (Cu)-Total (mg/kg)        | 13.7                  | 2.22                    | 1.68                      | 1.79                         | 1.47                         |
|                                                                       | Copper (Cu)-Total (mg/kg ww)     | 3.22                  | 0.513                   | 0.415                     | 0.430                        | 0.373                        |
|                                                                       | Lead (Pb)-Total (mg/kg)          | 0.27                  | 0.20                    | <0.10                     | <0.10                        | <0.10                        |
|                                                                       | Lead (Pb)-Total (mg/kg ww)       | 0.063                 | 0.047                   | <0.020                    | <0.020                       | <0.020                       |
|                                                                       | Lithium (Li)-Total (mg/kg)       | <0.50                 | <0.50                   | <0.50                     | <0.50                        | <0.50                        |
|                                                                       | Lithium (Li)-Total (mg/kg ww)    | <0.10                 | <0.10                   | <0.10                     | <0.10                        | <0.10                        |
|                                                                       | Magnesium (Mg)-Total (mg/kg)     | 1720                  | 1950                    | 1800                      | 1990                         | 1840                         |
|                                                                       | Magnesium (Mg)-Total (mg/kg ww)  | 405                   | 451                     | 445                       | 478                          | 468                          |
|                                                                       | Manganese (Mn)-Total (mg/kg)     | 33.8                  | 19.1                    | 32.9                      | 17.5                         | 16.2                         |
|                                                                       | Manganese (Mn)-Total (mg/kg ww)  | 7.94                  | 4.40                    | 8.15                      | 4.20                         | 4.11                         |
|                                                                       | Mercury (Hg)-Total (mg/kg)       | 0.163                 | 0.197                   | 0.135                     | 0.140                        | 0.0363                       |
|                                                                       | Mercury (Hg)-Total (mg/kg ww)    | 0.0384                | 0.0456                  | 0.0334                    | 0.0336                       | 0.0092                       |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)    | 0.289                 | 0.481                   | 0.314                     | 0.517                        | 0.353                        |
|                                                                       | Molybdenum (Mo)-Total (mg/kg ww) | 0.068                 | 0.111                   | 0.078                     | 0.124                        | 0.090                        |
|                                                                       | Nickel (Ni)-Total (mg/kg)        | 1.68                  | 2.26                    | 0.97                      | 1.92                         | 2.08                         |
|                                                                       | Nickel (Ni)-Total (mg/kg ww)     | 0.39                  | 0.52                    | 0.24                      | 0.46                         | 0.53                         |
|                                                                       | Selenium (Se)-Total (mg/kg)      | 3.52                  | 2.96                    | 2.88                      | 1.91                         | 2.04                         |
|                                                                       | Selenium (Se)-Total (mg/kg ww)   | 0.827                 | 0.684                   | 0.713                     | 0.458                        | 0.520                        |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                       |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-6                     | L677662-7                                | L677662-8                | L677662-9                     | L677662-10                    |
|-----------------------|-----------------------------------|-----------------------------------------------------------------------|-------------------------------|------------------------------------------|--------------------------|-------------------------------|-------------------------------|
|                       |                                   |                                                                       | 13-MAR-08                     | 19-MAR-08                                | 14-MAR-08                | 16-MAR-08                     | 16-MAR-08                     |
|                       |                                   |                                                                       | GUABINA 15CM<br>TL HF1 "HOJA" | GUABINA<br>15.4CM TL PF1<br>"PATAQUILLA" | GUABINA<br>25.1CM TL PF1 | GUABINA<br>21.8CM TL<br>H4/W4 | GUABINA<br>20.4CM TL<br>H4/W4 |
| Grouping              | Analyte                           |                                                                       |                               |                                          |                          |                               |                               |
| <b>TISSUE</b>         |                                   |                                                                       |                               |                                          |                          |                               |                               |
| <b>Physical Tests</b> | % Moisture (%)                    |                                                                       | 76.7                          | 76.0                                     | 73.9                     | 74.6                          | 73.8                          |
| <b>Metals</b>         | Aluminum (Al)-Total (mg/kg)       |                                                                       | 197                           | 16                                       | 29                       | 74                            | 132                           |
|                       | Aluminum (Al)-Total (mg/kg wwt)   |                                                                       | 45.9                          | 3.9                                      | 7.7                      | 18.9                          | 34.6                          |
|                       | Antimony (Sb)-Total (mg/kg)       |                                                                       | <0.050                        | <0.050                                   | <0.050                   | <0.10                         | <0.050                        |
|                       | Antimony (Sb)-Total (mg/kg wwt)   |                                                                       | <0.010                        | <0.010                                   | <0.010                   | <0.020                        | <0.010                        |
|                       | Arsenic (As)-Total (mg/kg)        |                                                                       | 3.34                          | 9.31                                     | 8.09                     | 0.44                          | 0.415                         |
|                       | Arsenic (As)-Total (mg/kg wwt)    |                                                                       | 0.780                         | 2.24                                     | 2.11                     | 0.112                         | 0.109                         |
|                       | Barium (Ba)-Total (mg/kg)         |                                                                       | 57.0                          | 16.4                                     | 15.7                     | 14.8                          | 13.7                          |
|                       | Barium (Ba)-Total (mg/kg wwt)     |                                                                       | 13.3                          | 3.94                                     | 4.10                     | 3.75                          | 3.59                          |
|                       | Beryllium (Be)-Total (mg/kg)      |                                                                       | <0.30                         | <0.30                                    | <0.30                    | <0.60                         | <0.30                         |
|                       | Beryllium (Be)-Total (mg/kg wwt)  |                                                                       | <0.10                         | <0.10                                    | <0.10                    | <0.20                         | <0.10                         |
|                       | Bismuth (Bi)-Total (mg/kg)        |                                                                       | <0.30                         | <0.30                                    | <0.30                    | <0.60                         | <0.30                         |
|                       | Bismuth (Bi)-Total (mg/kg wwt)    |                                                                       | <0.030                        | <0.030                                   | <0.030                   | <0.060                        | <0.030                        |
|                       | Cadmium (Cd)-Total (mg/kg)        |                                                                       | 0.076                         | 0.204                                    | 0.815                    | 0.079                         | 0.072                         |
|                       | Cadmium (Cd)-Total (mg/kg wwt)    |                                                                       | 0.0176                        | 0.0490                                   | 0.213                    | 0.020                         | 0.0189                        |
|                       | Calcium (Ca)-Total (mg/kg)        |                                                                       | 46200                         | 37900                                    | 28600                    | 40200                         | 41600                         |
|                       | Calcium (Ca)-Total (mg/kg wwt)    |                                                                       | 10800                         | 9120                                     | 7450                     | 10200                         | 10900                         |
|                       | Chromium (Cr)-Total (mg/kg)       |                                                                       | 2.48                          | 2.39                                     | 2.20                     | 3.1                           | 2.25                          |
|                       | Chromium (Cr)-Total (mg/kg wwt)   |                                                                       | 0.58                          | 0.57                                     | 0.58                     | 0.78                          | 0.59                          |
|                       | Cobalt (Co)-Total (mg/kg)         |                                                                       | 0.14                          | <0.10                                    | 0.12                     | <0.20                         | 0.42                          |
|                       | Cobalt (Co)-Total (mg/kg wwt)     |                                                                       | 0.034                         | <0.020                                   | 0.031                    | 0.048                         | 0.109                         |
|                       | Copper (Cu)-Total (mg/kg)         |                                                                       | 12.1                          | 1.74                                     | 7.21                     | 1.56                          | 2.23                          |
|                       | Copper (Cu)-Total (mg/kg wwt)     |                                                                       | 2.83                          | 0.418                                    | 1.88                     | 0.395                         | 0.584                         |
|                       | Lead (Pb)-Total (mg/kg)           |                                                                       | <0.10                         | 0.15                                     | <0.10                    | <0.20                         | <0.10                         |
|                       | Lead (Pb)-Total (mg/kg wwt)       |                                                                       | <0.020                        | 0.037                                    | <0.020                   | <0.040                        | <0.020                        |
|                       | Lithium (Li)-Total (mg/kg)        |                                                                       | <0.50                         | <0.50                                    | <0.50                    | <1.0                          | <0.50                         |
|                       | Lithium (Li)-Total (mg/kg wwt)    |                                                                       | <0.10                         | <0.10                                    | <0.10                    | <0.20                         | <0.10                         |
|                       | Magnesium (Mg)-Total (mg/kg)      |                                                                       | 1900                          | 1690                                     | 1390                     | 1710                          | 1660                          |
|                       | Magnesium (Mg)-Total (mg/kg wwt)  |                                                                       | 443                           | 408                                      | 364                      | 435                           | 435                           |
|                       | Manganese (Mn)-Total (mg/kg)      |                                                                       | 29.1                          | 17.2                                     | 15.6                     | 32.1                          | 156                           |
|                       | Manganese (Mn)-Total (mg/kg wwt)  |                                                                       | 6.79                          | 4.15                                     | 4.07                     | 8.15                          | 40.9                          |
|                       | Mercury (Hg)-Total (mg/kg)        |                                                                       | 0.0478                        | 0.0372                                   | 0.151                    | 0.163                         | 0.154                         |
|                       | Mercury (Hg)-Total (mg/kg wwt)    |                                                                       | 0.0112                        | 0.0090                                   | 0.0394                   | 0.0414                        | 0.0405                        |
|                       | Molybdenum (Mo)-Total (mg/kg)     |                                                                       | 0.397                         | 0.201                                    | 0.237                    | 0.39                          | 0.287                         |
|                       | Molybdenum (Mo)-Total (mg/kg wwt) |                                                                       | 0.093                         | 0.048                                    | 0.062                    | 0.099                         | 0.075                         |
|                       | Nickel (Ni)-Total (mg/kg)         |                                                                       | 1.31                          | 1.29                                     | 1.27                     | 1.9                           | 1.23                          |
|                       | Nickel (Ni)-Total (mg/kg wwt)     |                                                                       | 0.31                          | 0.31                                     | 0.33                     | 0.47                          | 0.32                          |
|                       | Selenium (Se)-Total (mg/kg)       |                                                                       | 1.75                          | 2.63                                     | 2.42                     | 1.80                          | 2.27                          |
|                       | Selenium (Se)-Total (mg/kg wwt)   |                                                                       | 0.408                         | 0.633                                    | 0.633                    | 0.455                         | 0.595                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                       |                                  | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-11                         | L677662-12                    | L677662-13                            | L677662-14                                    | L677662-15                               |
|-----------------------|----------------------------------|-----------------------------------------------------------------------|------------------------------------|-------------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------|
| Grouping              | Analyte                          |                                                                       | CAIMITO<br>13.5CM CF2<br>"GUABINA" | G. DORIMITOR<br>10.2CM TL CF1 | CAIMITO<br>20.2CM TL CF2<br>"GUABINA" | G. DORIMITOR<br>15.7CM TL RF1<br>"RINCONCITO" | GUABINA<br>20.6CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>         |                                  |                                                                       |                                    |                               |                                       |                                               |                                          |
| <b>Physical Tests</b> | % Moisture (%)                   |                                                                       | 77.2                               | 74.1                          | 77.1                                  | 72.6                                          | 77.8                                     |
| <b>Metals</b>         | Aluminum (Al)-Total (mg/kg)      |                                                                       | 21                                 | <20                           | 23                                    | 30                                            | 12                                       |
|                       | Aluminum (Al)-Total (mg/kg ww)   |                                                                       | 4.9                                | 5.2                           | 5.4                                   | 8.3                                           | 2.7                                      |
|                       | Antimony (Sb)-Total (mg/kg)      |                                                                       | <0.050                             | <0.10                         | <0.10                                 | <0.10                                         | <0.050                                   |
|                       | Antimony (Sb)-Total (mg/kg ww)   |                                                                       | <0.010                             | <0.020                        | <0.020                                | <0.020                                        | <0.010                                   |
|                       | Arsenic (As)-Total (mg/kg)       |                                                                       | 5.27                               | 5.00                          | 9.99                                  | 1.90                                          | 9.20                                     |
|                       | Arsenic (As)-Total (mg/kg ww)    |                                                                       | 1.20                               | 1.29                          | 2.29                                  | 0.520                                         | 2.04                                     |
|                       | Barium (Ba)-Total (mg/kg)        |                                                                       | 28.3                               | 31.4                          | 53.0                                  | 23.4                                          | 21.9                                     |
|                       | Barium (Ba)-Total (mg/kg ww)     |                                                                       | 6.46                               | 8.13                          | 12.1                                  | 6.42                                          | 4.87                                     |
|                       | Beryllium (Be)-Total (mg/kg)     |                                                                       | <0.30                              | <0.60                         | <0.60                                 | <0.60                                         | <0.30                                    |
|                       | Beryllium (Be)-Total (mg/kg ww)  |                                                                       | <0.10                              | <0.20                         | <0.20                                 | <0.20                                         | <0.10                                    |
|                       | Bismuth (Bi)-Total (mg/kg)       |                                                                       | <0.30                              | <0.60                         | <0.60                                 | <0.60                                         | <0.30                                    |
|                       | Bismuth (Bi)-Total (mg/kg ww)    |                                                                       | <0.030                             | <0.060                        | <0.060                                | <0.060                                        | <0.030                                   |
|                       | Cadmium (Cd)-Total (mg/kg)       |                                                                       | 0.095                              | 0.088                         | 0.242                                 | 0.138                                         | 0.524                                    |
|                       | Cadmium (Cd)-Total (mg/kg ww)    |                                                                       | 0.0218                             | 0.023                         | 0.055                                 | 0.038                                         | 0.116                                    |
|                       | Calcium (Ca)-Total (mg/kg)       |                                                                       | 54600                              | 49300                         | 47800                                 | 56600                                         | 37800                                    |
|                       | Calcium (Ca)-Total (mg/kg ww)    |                                                                       | 12500                              | 12800                         | 10900                                 | 15500                                         | 8390                                     |
|                       | Chromium (Cr)-Total (mg/kg)      |                                                                       | 1.51                               | <1.0                          | 3.6                                   | 2.1                                           | 1.92                                     |
|                       | Chromium (Cr)-Total (mg/kg ww)   |                                                                       | 0.34                               | <0.20                         | 0.82                                  | 0.57                                          | 0.43                                     |
|                       | Cobalt (Co)-Total (mg/kg)        |                                                                       | <0.10                              | <0.20                         | <0.20                                 | <0.20                                         | <0.10                                    |
|                       | Cobalt (Co)-Total (mg/kg ww)     |                                                                       | <0.020                             | <0.040                        | 0.041                                 | <0.040                                        | <0.020                                   |
|                       | Copper (Cu)-Total (mg/kg)        |                                                                       | 1.60                               | 1.78                          | 7.23                                  | 1.49                                          | 7.31                                     |
|                       | Copper (Cu)-Total (mg/kg ww)     |                                                                       | 0.365                              | 0.461                         | 1.65                                  | 0.409                                         | 1.62                                     |
|                       | Lead (Pb)-Total (mg/kg)          |                                                                       | <0.10                              | <0.20                         | <0.20                                 | <0.20                                         | 0.11                                     |
|                       | Lead (Pb)-Total (mg/kg ww)       |                                                                       | <0.020                             | <0.040                        | <0.040                                | <0.040                                        | 0.025                                    |
|                       | Lithium (Li)-Total (mg/kg)       |                                                                       | <0.50                              | <1.0                          | <1.0                                  | <1.0                                          | <0.50                                    |
|                       | Lithium (Li)-Total (mg/kg ww)    |                                                                       | <0.10                              | <0.20                         | <0.20                                 | <0.20                                         | <0.10                                    |
|                       | Magnesium (Mg)-Total (mg/kg)     |                                                                       | 1920                               | 1780                          | 2060                                  | 1910                                          | 1790                                     |
|                       | Magnesium (Mg)-Total (mg/kg ww)  |                                                                       | 439                                | 460                           | 472                                   | 522                                           | 397                                      |
|                       | Manganese (Mn)-Total (mg/kg)     |                                                                       | 16.3                               | 21.4                          | 30.7                                  | 16.0                                          | 15.7                                     |
|                       | Manganese (Mn)-Total (mg/kg ww)  |                                                                       | 3.72                               | 5.53                          | 7.03                                  | 4.37                                          | 3.48                                     |
|                       | Mercury (Hg)-Total (mg/kg)       |                                                                       | 0.0556                             | 0.0421                        | 0.164                                 | 0.115                                         | 0.329                                    |
|                       | Mercury (Hg)-Total (mg/kg ww)    |                                                                       | 0.0127                             | 0.0109                        | 0.0375                                | 0.0314                                        | 0.0731                                   |
|                       | Molybdenum (Mo)-Total (mg/kg)    |                                                                       | 0.366                              | 0.12                          | 0.34                                  | 0.56                                          | 0.182                                    |
|                       | Molybdenum (Mo)-Total (mg/kg ww) |                                                                       | 0.084                              | 0.031                         | 0.078                                 | 0.152                                         | 0.040                                    |
|                       | Nickel (Ni)-Total (mg/kg)        |                                                                       | 0.78                               | <1.0                          | 2.0                                   | 1.3                                           | 1.07                                     |
|                       | Nickel (Ni)-Total (mg/kg ww)     |                                                                       | 0.18                               | <0.20                         | 0.47                                  | 0.35                                          | 0.24                                     |
|                       | Selenium (Se)-Total (mg/kg)      |                                                                       | 2.43                               | 2.15                          | 1.96                                  | 1.05                                          | 2.85                                     |
|                       | Selenium (Se)-Total (mg/kg ww)   |                                                                       | 0.554                              | 0.557                         | 0.447                                 | 0.288                                         | 0.634                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                       |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-16             | L677662-17                               | L677662-18               | L677662-19              | L677662-20                               |
|-----------------------|-----------------------------------|-----------------------------------------------------------------------|------------------------|------------------------------------------|--------------------------|-------------------------|------------------------------------------|
| Grouping              | Analyte                           |                                                                       | GUABINA<br>22.8CM SJF1 | GUABINA<br>16.4CM TL PF1<br>"PETAQUILLA" | GUABINA<br>17.6CM TL PF1 | GUABINA<br>19.1CM TL W7 | GUABINA<br>23.4CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>         |                                   |                                                                       |                        |                                          |                          |                         |                                          |
| <b>Physical Tests</b> | % Moisture (%)                    |                                                                       | 74.9                   | 74.3                                     | 74.4                     | 75.4                    | 78.8                                     |
| <b>Metals</b>         | Aluminum (Al)-Total (mg/kg)       |                                                                       | 25                     | <10                                      | 14                       | 27                      | 22                                       |
|                       | Aluminum (Al)-Total (mg/kg wwt)   |                                                                       | 6.2                    | 2.2                                      | 3.6                      | 6.7                     | 4.6                                      |
|                       | Antimony (Sb)-Total (mg/kg)       |                                                                       | <0.050                 | <0.050                                   | <0.050                   | <0.10                   | <0.050                                   |
|                       | Antimony (Sb)-Total (mg/kg wwt)   |                                                                       | <0.010                 | <0.010                                   | <0.010                   | <0.020                  | <0.010                                   |
|                       | Arsenic (As)-Total (mg/kg)        |                                                                       | 1.27                   | 7.56                                     | 7.74                     | 1.09                    | 2.42                                     |
|                       | Arsenic (As)-Total (mg/kg wwt)    |                                                                       | 0.318                  | 1.94                                     | 1.98                     | 0.269                   | 0.515                                    |
|                       | Barium (Ba)-Total (mg/kg)         |                                                                       | 11.4                   | 15.9                                     | 15.7                     | 18.4                    | 59.1                                     |
|                       | Barium (Ba)-Total (mg/kg wwt)     |                                                                       | 2.85                   | 4.08                                     | 4.02                     | 4.52                    | 12.6                                     |
|                       | Beryllium (Be)-Total (mg/kg)      |                                                                       | <0.30                  | <0.30                                    | <0.30                    | <0.60                   | <0.30                                    |
|                       | Beryllium (Be)-Total (mg/kg wwt)  |                                                                       | <0.10                  | <0.10                                    | <0.10                    | <0.20                   | <0.10                                    |
|                       | Bismuth (Bi)-Total (mg/kg)        |                                                                       | <0.30                  | <0.30                                    | <0.30                    | <0.60                   | <0.30                                    |
|                       | Bismuth (Bi)-Total (mg/kg wwt)    |                                                                       | <0.030                 | <0.030                                   | <0.030                   | <0.060                  | <0.030                                   |
|                       | Cadmium (Cd)-Total (mg/kg)        |                                                                       | 0.070                  | 0.310                                    | 0.177                    | 0.088                   | 0.360                                    |
|                       | Cadmium (Cd)-Total (mg/kg wwt)    |                                                                       | 0.0175                 | 0.0796                                   | 0.0453                   | 0.022                   | 0.0765                                   |
|                       | Calcium (Ca)-Total (mg/kg)        |                                                                       | 43200                  | 40100                                    | 36400                    | 53000                   | 46600                                    |
|                       | Calcium (Ca)-Total (mg/kg wwt)    |                                                                       | 10800                  | 10300                                    | 9310                     | 13000                   | 9900                                     |
|                       | Chromium (Cr)-Total (mg/kg)       |                                                                       | 4.25                   | 4.21                                     | 5.65                     | 2.2                     | 6.30                                     |
|                       | Chromium (Cr)-Total (mg/kg wwt)   |                                                                       | 1.06                   | 1.08                                     | 1.44                     | 0.54                    | 1.34                                     |
|                       | Cobalt (Co)-Total (mg/kg)         |                                                                       | 0.15                   | <0.10                                    | <0.10                    | <0.20                   | 0.18                                     |
|                       | Cobalt (Co)-Total (mg/kg wwt)     |                                                                       | 0.038                  | <0.020                                   | 0.023                    | <0.040                  | 0.038                                    |
|                       | Copper (Cu)-Total (mg/kg)         |                                                                       | 2.15                   | 2.68                                     | 3.53                     | 1.78                    | 10.8                                     |
|                       | Copper (Cu)-Total (mg/kg wwt)     |                                                                       | 0.539                  | 0.689                                    | 0.903                    | 0.438                   | 2.28                                     |
|                       | Lead (Pb)-Total (mg/kg)           |                                                                       | <0.10                  | 0.11                                     | 0.22                     | <0.20                   | 0.14                                     |
|                       | Lead (Pb)-Total (mg/kg wwt)       |                                                                       | <0.020                 | 0.029                                    | 0.056                    | <0.040                  | 0.031                                    |
|                       | Lithium (Li)-Total (mg/kg)        |                                                                       | <0.50                  | <0.50                                    | <0.50                    | <1.0                    | <0.50                                    |
|                       | Lithium (Li)-Total (mg/kg wwt)    |                                                                       | <0.10                  | <0.10                                    | <0.10                    | <0.20                   | <0.10                                    |
|                       | Magnesium (Mg)-Total (mg/kg)      |                                                                       | 1680                   | 1660                                     | 1650                     | 1900                    | 1980                                     |
|                       | Magnesium (Mg)-Total (mg/kg wwt)  |                                                                       | 422                    | 426                                      | 422                      | 467                     | 421                                      |
|                       | Manganese (Mn)-Total (mg/kg)      |                                                                       | 27.0                   | 16.3                                     | 16.9                     | 25.1                    | 23.5                                     |
|                       | Manganese (Mn)-Total (mg/kg wwt)  |                                                                       | 6.77                   | 4.18                                     | 4.33                     | 6.17                    | 4.99                                     |
|                       | Mercury (Hg)-Total (mg/kg)        |                                                                       | 0.184                  | 0.0430                                   | 0.0353                   | 0.176                   | 0.198                                    |
|                       | Mercury (Hg)-Total (mg/kg wwt)    |                                                                       | 0.0462                 | 0.0111                                   | 0.0090                   | 0.0433                  | 0.0421                                   |
|                       | Molybdenum (Mo)-Total (mg/kg)     |                                                                       | 0.380                  | 0.361                                    | 0.311                    | 0.27                    | 0.652                                    |
|                       | Molybdenum (Mo)-Total (mg/kg wwt) |                                                                       | 0.095                  | 0.093                                    | 0.080                    | 0.066                   | 0.138                                    |
|                       | Nickel (Ni)-Total (mg/kg)         |                                                                       | 2.36                   | 2.41                                     | 3.00                     | 1.2                     | 3.95                                     |
|                       | Nickel (Ni)-Total (mg/kg wwt)     |                                                                       | 0.59                   | 0.62                                     | 0.77                     | 0.31                    | 0.84                                     |
|                       | Selenium (Se)-Total (mg/kg)       |                                                                       | 2.26                   | 2.19                                     | 2.76                     | 3.08                    | 3.30                                     |
|                       | Selenium (Se)-Total (mg/kg wwt)   |                                                                       | 0.567                  | 0.562                                    | 0.706                    | 0.758                   | 0.702                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                  | Sample ID    | L677662-21 | L677662-22   | L677662-23 | L677662-24   | L677662-25    |
|----------------|----------------------------------|--------------|------------|--------------|------------|--------------|---------------|
|                |                                  | Description  |            |              |            |              |               |
|                |                                  | Sampled Date | 14-MAR-08  | 13-MAR-08    | 18-MAR-08  | 13-MAR-08    | 11-MAR-08     |
|                |                                  | Sampled Time |            |              |            |              |               |
|                |                                  | Client ID    | GUABINA    | GUABINA 19.3 | GUABINA    | GUABINA 16.1 | GUABINA       |
| Grouping       | Analyte                          |              | 19.7CM PF1 | TL RF1       | 23.0CM TL  | TL HF1       | 10.6CM TL CF1 |
|                |                                  |              | "GUABINA"  | "RINCONCITO" | BFH1       | "GUABINA"    | "CAIMITO"     |
| TISSUE         |                                  |              |            |              |            |              |               |
| Physical Tests | % Moisture (%)                   |              | 76.3       | 77.4         | 77.2       | 76.1         | 74.2          |
| Metals         | Aluminum (Al)-Total (mg/kg)      |              | <20        | 18           | 115        | 50           | 23            |
|                | Aluminum (Al)-Total (mg/kg ww)   |              | <4.0       | 4.0          | 26.1       | 12.0         | 5.8           |
|                | Antimony (Sb)-Total (mg/kg)      |              | <0.10      | <0.050       | <0.10      | <0.050       | <0.10         |
|                | Antimony (Sb)-Total (mg/kg ww)   |              | <0.020     | <0.010       | <0.020     | <0.010       | <0.020        |
|                | Arsenic (As)-Total (mg/kg)       |              | 7.44       | 5.78         | 0.13       | 3.77         | 5.77          |
|                | Arsenic (As)-Total (mg/kg ww)    |              | 1.76       | 1.31         | 0.030      | 0.900        | 1.49          |
|                | Barium (Ba)-Total (mg/kg)        |              | 22.0       | 25.5         | 16.2       | 42.8         | 38.4          |
|                | Barium (Ba)-Total (mg/kg ww)     |              | 5.19       | 5.77         | 3.70       | 10.2         | 9.90          |
|                | Beryllium (Be)-Total (mg/kg)     |              | <0.60      | <0.30        | <0.60      | <0.30        | <0.60         |
|                | Beryllium (Be)-Total (mg/kg ww)  |              | <0.20      | <0.10        | <0.20      | <0.10        | <0.20         |
|                | Bismuth (Bi)-Total (mg/kg)       |              | <0.60      | <0.30        | <0.60      | <0.30        | <0.60         |
|                | Bismuth (Bi)-Total (mg/kg ww)    |              | <0.060     | <0.030       | <0.060     | <0.030       | <0.060        |
|                | Cadmium (Cd)-Total (mg/kg)       |              | 1.01       | 0.208        | 0.134      | 0.114        | 0.088         |
|                | Cadmium (Cd)-Total (mg/kg ww)    |              | 0.240      | 0.0471       | 0.031      | 0.0273       | 0.023         |
|                | Calcium (Ca)-Total (mg/kg)       |              | 57000      | 45400        | 52400      | 44300        | 58500         |
|                | Calcium (Ca)-Total (mg/kg ww)    |              | 13500      | 10300        | 11900      | 10600        | 15100         |
|                | Chromium (Cr)-Total (mg/kg)      |              | 1.4        | 2.23         | 3.6        | 5.56         | <1.0          |
|                | Chromium (Cr)-Total (mg/kg ww)   |              | 0.33       | 0.51         | 0.82       | 1.33         | <0.20         |
|                | Cobalt (Co)-Total (mg/kg)        |              | 0.21       | <0.10        | <0.20      | 0.20         | <0.20         |
|                | Cobalt (Co)-Total (mg/kg ww)     |              | 0.051      | <0.020       | <0.040     | 0.047        | <0.040        |
|                | Copper (Cu)-Total (mg/kg)        |              | 3.17       | 1.72         | 2.54       | 4.18         | 1.54          |
|                | Copper (Cu)-Total (mg/kg ww)     |              | 0.749      | 0.388        | 0.579      | 0.998        | 0.397         |
|                | Lead (Pb)-Total (mg/kg)          |              | <0.20      | <0.10        | 0.25       | <0.10        | <0.20         |
|                | Lead (Pb)-Total (mg/kg ww)       |              | 0.047      | <0.020       | 0.058      | <0.020       | <0.040        |
|                | Lithium (Li)-Total (mg/kg)       |              | <1.0       | <0.50        | <1.0       | <0.50        | <1.0          |
|                | Lithium (Li)-Total (mg/kg ww)    |              | <0.20      | <0.10        | <0.20      | <0.10        | <0.20         |
|                | Magnesium (Mg)-Total (mg/kg)     |              | 1970       | 1910         | 1990       | 1810         | 2040          |
|                | Magnesium (Mg)-Total (mg/kg ww)  |              | 466        | 432          | 452        | 433          | 525           |
|                | Manganese (Mn)-Total (mg/kg)     |              | 21.7       | 10.2         | 55.3       | 17.4         | 23.6          |
|                | Manganese (Mn)-Total (mg/kg ww)  |              | 5.14       | 2.32         | 12.6       | 4.16         | 6.08          |
|                | Mercury (Hg)-Total (mg/kg)       |              | 0.181      | 0.0642       | 0.237      | 0.0736       | 0.0504        |
|                | Mercury (Hg)-Total (mg/kg ww)    |              | 0.0428     | 0.0145       | 0.0540     | 0.0176       | 0.0130        |
|                | Molybdenum (Mo)-Total (mg/kg)    |              | 0.21       | 0.259        | 0.52       | 0.697        | 0.19          |
|                | Molybdenum (Mo)-Total (mg/kg ww) |              | 0.049      | 0.059        | 0.117      | 0.167        | 0.048         |
|                | Nickel (Ni)-Total (mg/kg)        |              | <1.0       | 1.22         | 2.2        | 3.27         | <1.0          |
|                | Nickel (Ni)-Total (mg/kg ww)     |              | 0.20       | 0.28         | 0.50       | 0.78         | <0.20         |
|                | Selenium (Se)-Total (mg/kg)      |              | 3.19       | 1.52         | 1.92       | 1.75         | 1.92          |
|                | Selenium (Se)-Total (mg/kg ww)   |              | 0.755      | 0.343        | 0.436      | 0.417        | 0.495         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-26            | L677662-27                   | L677662-28                | L677662-29                            | L677662-30                  |
|----------------|-----------------------------------|-----------------------------------------------------------------------|-----------------------|------------------------------|---------------------------|---------------------------------------|-----------------------------|
| Grouping       |                                   | Analyte                                                               | GUABINA HFI<br>"HOJA" | BOCA CHICA<br>14.6CM TL SJF1 | BOCA CHICA<br>18CM FL CF1 | BOCA CHICA<br>19.9CM TL HF1<br>"HOJA" | LORICARDAL<br>9.9CM TL BFH1 |
| TISSUE         |                                   |                                                                       |                       |                              |                           |                                       |                             |
| Physical Tests | % Moisture (%)                    |                                                                       | 76.7                  | 71.5                         | 74.9                      | 71.9                                  | 59.6                        |
| Metals         | Aluminum (Al)-Total (mg/kg)       |                                                                       | 51                    | 2160                         | 1550                      | 1900                                  | 3450                        |
|                | Aluminum (Al)-Total (mg/kg wwt)   |                                                                       | 11.9                  | 617                          | 390                       | 534                                   | 1390                        |
|                | Antimony (Sb)-Total (mg/kg)       |                                                                       | <0.050                | <0.10                        | <0.10                     | <0.050                                | <0.050                      |
|                | Antimony (Sb)-Total (mg/kg wwt)   |                                                                       | <0.010                | <0.020                       | <0.020                    | <0.010                                | <0.010                      |
|                | Arsenic (As)-Total (mg/kg)        |                                                                       | 4.55                  | 0.45                         | 0.30                      | 0.255                                 | 0.118                       |
|                | Arsenic (As)-Total (mg/kg wwt)    |                                                                       | 1.06                  | 0.129                        | 0.075                     | 0.072                                 | 0.048                       |
|                | Barium (Ba)-Total (mg/kg)         |                                                                       | 21.2                  | 58.8                         | 139                       | 83.1                                  | 23.3                        |
|                | Barium (Ba)-Total (mg/kg wwt)     |                                                                       | 4.95                  | 16.8                         | 34.8                      | 23.4                                  | 9.39                        |
|                | Beryllium (Be)-Total (mg/kg)      |                                                                       | <0.30                 | <0.60                        | <0.60                     | <0.30                                 | <0.30                       |
|                | Beryllium (Be)-Total (mg/kg wwt)  |                                                                       | <0.10                 | <0.20                        | <0.20                     | <0.10                                 | <0.10                       |
|                | Bismuth (Bi)-Total (mg/kg)        |                                                                       | <0.30                 | <0.60                        | <0.60                     | <0.30                                 | <0.30                       |
|                | Bismuth (Bi)-Total (mg/kg wwt)    |                                                                       | <0.030                | <0.060                       | <0.060                    | <0.030                                | <0.030                      |
|                | Cadmium (Cd)-Total (mg/kg)        |                                                                       | 0.116                 | 0.144                        | 0.188                     | 0.057                                 | 0.143                       |
|                | Cadmium (Cd)-Total (mg/kg wwt)    |                                                                       | 0.0271                | 0.041                        | 0.047                     | 0.0161                                | 0.0577                      |
|                | Calcium (Ca)-Total (mg/kg)        |                                                                       | 38200                 | 53900                        | 68100                     | 39500                                 | 22800                       |
|                | Calcium (Ca)-Total (mg/kg wwt)    |                                                                       | 8900                  | 15400                        | 17100                     | 11100                                 | 9190                        |
|                | Chromium (Cr)-Total (mg/kg)       |                                                                       | 7.50                  | 15.4                         | 18.7                      | 27.7                                  | 1.74                        |
|                | Chromium (Cr)-Total (mg/kg wwt)   |                                                                       | 1.75                  | 4.40                         | 4.69                      | 7.80                                  | 0.70                        |
|                | Cobalt (Co)-Total (mg/kg)         |                                                                       | 0.12                  | 1.97                         | 1.95                      | 1.71                                  | 1.93                        |
|                | Cobalt (Co)-Total (mg/kg wwt)     |                                                                       | 0.029                 | 0.562                        | 0.491                     | 0.480                                 | 0.779                       |
|                | Copper (Cu)-Total (mg/kg)         |                                                                       | 2.36                  | 5.58                         | 6.94                      | 9.08                                  | 36.9                        |
|                | Copper (Cu)-Total (mg/kg wwt)     |                                                                       | 0.551                 | 1.59                         | 1.74                      | 2.55                                  | 14.9                        |
|                | Lead (Pb)-Total (mg/kg)           |                                                                       | <0.10                 | 0.28                         | 0.87                      | 0.38                                  | 0.55                        |
|                | Lead (Pb)-Total (mg/kg wwt)       |                                                                       | <0.020                | 0.079                        | 0.220                     | 0.106                                 | 0.224                       |
|                | Lithium (Li)-Total (mg/kg)        |                                                                       | <0.50                 | <1.0                         | <1.0                      | <0.50                                 | <0.50                       |
|                | Lithium (Li)-Total (mg/kg wwt)    |                                                                       | <0.10                 | <0.20                        | <0.20                     | <0.10                                 | 0.13                        |
|                | Magnesium (Mg)-Total (mg/kg)      |                                                                       | 1770                  | 1740                         | 1830                      | 1540                                  | 565                         |
|                | Magnesium (Mg)-Total (mg/kg wwt)  |                                                                       | 413                   | 497                          | 460                       | 433                                   | 228                         |
|                | Manganese (Mn)-Total (mg/kg)      |                                                                       | 11.8                  | 259                          | 343                       | 84.2                                  | 252                         |
|                | Manganese (Mn)-Total (mg/kg wwt)  |                                                                       | 2.74                  | 74.0                         | 86.2                      | 23.7                                  | 102                         |
|                | Mercury (Hg)-Total (mg/kg)        |                                                                       | 0.0533                | 0.154                        | 0.0482                    | 0.0520                                | 0.0358                      |
|                | Mercury (Hg)-Total (mg/kg wwt)    |                                                                       | 0.0124                | 0.0440                       | 0.0121                    | 0.0146                                | 0.0145                      |
|                | Molybdenum (Mo)-Total (mg/kg)     |                                                                       | 0.698                 | 1.15                         | 4.55                      | 6.53                                  | 1.11                        |
|                | Molybdenum (Mo)-Total (mg/kg wwt) |                                                                       | 0.163                 | 0.329                        | 1.14                      | 1.84                                  | 0.449                       |
|                | Nickel (Ni)-Total (mg/kg)         |                                                                       | 4.11                  | 8.6                          | 10.1                      | 18.5                                  | 0.51                        |
|                | Nickel (Ni)-Total (mg/kg wwt)     |                                                                       | 0.96                  | 2.46                         | 2.54                      | 5.20                                  | 0.21                        |
|                | Selenium (Se)-Total (mg/kg)       |                                                                       | 2.01                  | 1.77                         | 1.66                      | 1.00                                  | 0.68                        |
|                | Selenium (Se)-Total (mg/kg wwt)   |                                                                       | 0.45                  | 0.504                        | 0.416                     | 0.282                                 | 0.276                       |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                       |                                  | Sample ID    | L677662-31   | L677662-32     | L677662-33     | L677662-34                   | L677662-35    |
|-----------------------|----------------------------------|--------------|--------------|----------------|----------------|------------------------------|---------------|
|                       |                                  | Description  |              |                |                |                              |               |
|                       |                                  | Sampled Date | 18-MAR-08    | 16-MAR-08      | 18-MAR-08      | 13-MAR-08                    | 18-MAR-08     |
|                       |                                  | Sampled Time |              |                |                |                              |               |
|                       |                                  | Client ID    | LORICARDAL   | BRYCON         | BRYCON         | BRYCON                       | BRYCON        |
| Grouping              | Analyte                          |              | 13CM TL BFH1 | 14.3CM TL SJF1 | 13.4CM TL BFH1 | 14.8CM TL RF1<br>"RICONCITO" | 11.7CM TL MF1 |
| <b>TISSUE</b>         |                                  |              |              |                |                |                              |               |
| <b>Physical Tests</b> | % Moisture (%)                   |              | 67.6         | 76.1           | 75.9           | 77.0                         | 75.3          |
| <b>Metals</b>         | Aluminum (Al)-Total (mg/kg)      |              | 4110         | 555            | 64             | 83                           | 92            |
|                       | Aluminum (Al)-Total (mg/kg ww)   |              | 1330         | 133            | 15.5           | 19.1                         | 22.7          |
|                       | Antimony (Sb)-Total (mg/kg)      |              | <0.15        | <0.050         | <0.10          | <0.10                        | <0.10         |
|                       | Antimony (Sb)-Total (mg/kg ww)   |              | <0.030       | <0.010         | <0.020         | <0.020                       | <0.020        |
|                       | Arsenic (As)-Total (mg/kg)       |              | 0.16         | 0.558          | <0.10          | 1.09                         | <0.10         |
|                       | Arsenic (As)-Total (mg/kg ww)    |              | 0.052        | 0.134          | <0.020         | 0.251                        | <0.020        |
|                       | Barium (Ba)-Total (mg/kg)        |              | 105          | 298            | 12.4           | 14.7                         | 21.3          |
|                       | Barium (Ba)-Total (mg/kg ww)     |              | 34.1         | 71.5           | 2.99           | 3.36                         | 5.24          |
|                       | Beryllium (Be)-Total (mg/kg)     |              | <0.90        | <0.30          | <0.60          | <0.60                        | <0.60         |
|                       | Beryllium (Be)-Total (mg/kg ww)  |              | <0.30        | <0.10          | <0.20          | <0.20                        | <0.20         |
|                       | Bismuth (Bi)-Total (mg/kg)       |              | <0.90        | <0.30          | <0.60          | <0.60                        | <0.60         |
|                       | Bismuth (Bi)-Total (mg/kg ww)    |              | <0.090       | <0.030         | <0.060         | <0.060                       | <0.060        |
|                       | Cadmium (Cd)-Total (mg/kg)       |              | 0.198        | 0.095          | 0.327          | 0.364                        | 0.287         |
|                       | Cadmium (Cd)-Total (mg/kg ww)    |              | 0.064        | 0.0228         | 0.079          | 0.084                        | 0.071         |
|                       | Calcium (Ca)-Total (mg/kg)       |              | 104000       | 31700          | 45400          | 41300                        | 71400         |
|                       | Calcium (Ca)-Total (mg/kg ww)    |              | 33600        | 7590           | 10900          | 9470                         | 17600         |
|                       | Chromium (Cr)-Total (mg/kg)      |              | 59.5         | 1.57           | 5.2            | 2.6                          | 10.5          |
|                       | Chromium (Cr)-Total (mg/kg ww)   |              | 19.3         | 0.38           | 1.25           | 0.59                         | 2.58          |
|                       | Cobalt (Co)-Total (mg/kg)        |              | 1.88         | 1.07           | <0.20          | <0.20                        | 0.24          |
|                       | Cobalt (Co)-Total (mg/kg ww)     |              | 0.610        | 0.257          | <0.040         | <0.040                       | 0.059         |
|                       | Copper (Cu)-Total (mg/kg)        |              | 123          | 3.51           | 4.20           | 4.37                         | 3.98          |
|                       | Copper (Cu)-Total (mg/kg ww)     |              | 39.8         | 0.841          | 1.01           | 1.00                         | 0.982         |
|                       | Lead (Pb)-Total (mg/kg)          |              | 0.98         | 1.10           | <0.20          | <0.20                        | 0.33          |
|                       | Lead (Pb)-Total (mg/kg ww)       |              | 0.319        | 0.263          | 0.041          | <0.040                       | 0.082         |
|                       | Lithium (Li)-Total (mg/kg)       |              | <1.5         | <0.50          | <1.0           | <1.0                         | <1.0          |
|                       | Lithium (Li)-Total (mg/kg ww)    |              | <0.30        | <0.10          | <0.20          | <0.20                        | <0.20         |
|                       | Magnesium (Mg)-Total (mg/kg)     |              | 1960         | 1410           | 1680           | 1690                         | 2030          |
|                       | Magnesium (Mg)-Total (mg/kg ww)  |              | 637          | 338            | 405            | 388                          | 501           |
|                       | Manganese (Mn)-Total (mg/kg)     |              | 134          | 148            | 69.8           | 28.3                         | 162           |
|                       | Manganese (Mn)-Total (mg/kg ww)  |              | 43.6         | 35.5           | 16.8           | 6.49                         | 40.1          |
|                       | Mercury (Hg)-Total (mg/kg)       |              | 0.107        | 0.0722         | 0.0447         | 0.0264                       | 0.106         |
|                       | Mercury (Hg)-Total (mg/kg ww)    |              | 0.0347       | 0.0173         | 0.0108         | 0.0061                       | 0.0260        |
|                       | Molybdenum (Mo)-Total (mg/kg)    |              | 4.86         | 0.136          | 0.38           | 0.20                         | 0.59          |
|                       | Molybdenum (Mo)-Total (mg/kg ww) |              | 1.57         | 0.033          | 0.091          | 0.046                        | 0.144         |
|                       | Nickel (Ni)-Total (mg/kg)        |              | 33.7         | 0.67           | 2.9            | 1.4                          | 5.6           |
|                       | Nickel (Ni)-Total (mg/kg ww)     |              | 10.9         | 0.16           | 0.69           | 0.33                         | 1.39          |
|                       | Selenium (Se)-Total (mg/kg)      |              | 1.37         | 1.07           | 0.71           | 1.52                         | 0.89          |
|                       | Selenium (Se)-Total (mg/kg ww)   |              | 0.443        | 0.257          | 0.172          | 0.348                        | 0.220         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-36               | L677662-37              | L677662-38                  | L677662-39                  | L677662-40              |
|----------------|-----------------------------------|-----------------------------------------------------------------------|--------------------------|-------------------------|-----------------------------|-----------------------------|-------------------------|
|                |                                   |                                                                       | 16-MAR-08                | 18-MAR-08               | 18-MAR-08                   | 18-MAR-08                   | 18-MAR-08               |
|                |                                   |                                                                       | BRYCON<br>13.3CM TL SJF1 | BRYCON<br>15.5CM TL MF1 | BRYCON<br>14.8CM TL<br>BFH1 | BRYCON<br>13.7CM TL<br>BFH1 | BRYCON<br>16.3CM TL MF1 |
| Grouping       | Analyte                           |                                                                       |                          |                         |                             |                             |                         |
| <b>TISSUE</b>  |                                   |                                                                       |                          |                         |                             |                             |                         |
| Physical Tests | % Moisture (%)                    |                                                                       | 70.2                     | 77.4                    | 75.8                        | 74.4                        | 69.1                    |
| Metals         | Aluminum (Al)-Total (mg/kg)       |                                                                       | 228                      | 168                     | 307                         | 2610                        | 118                     |
|                | Aluminum (Al)-Total (mg/kg wwt)   |                                                                       | 68.0                     | 38.0                    | 74.4                        | 669                         | 36.6                    |
|                | Antimony (Sb)-Total (mg/kg)       |                                                                       | <0.050                   | <0.050                  | <0.050                      | <0.10                       | <0.050                  |
|                | Antimony (Sb)-Total (mg/kg wwt)   |                                                                       | 0.013                    | <0.010                  | <0.010                      | <0.020                      | <0.010                  |
|                | Arsenic (As)-Total (mg/kg)        |                                                                       | 0.128                    | 0.101                   | 0.171                       | <0.10                       | <0.050                  |
|                | Arsenic (As)-Total (mg/kg wwt)    |                                                                       | 0.038                    | 0.023                   | 0.041                       | 0.021                       | <0.010                  |
|                | Barium (Ba)-Total (mg/kg)         |                                                                       | 78.5                     | 14.5                    | 15.8                        | 66.0                        | 7.10                    |
|                | Barium (Ba)-Total (mg/kg wwt)     |                                                                       | 23.4                     | 3.28                    | 3.83                        | 16.9                        | 2.20                    |
|                | Beryllium (Be)-Total (mg/kg)      |                                                                       | <0.30                    | <0.30                   | <0.30                       | <0.60                       | <0.30                   |
|                | Beryllium (Be)-Total (mg/kg wwt)  |                                                                       | <0.10                    | <0.10                   | <0.10                       | <0.20                       | <0.10                   |
|                | Bismuth (Bi)-Total (mg/kg)        |                                                                       | <0.30                    | <0.30                   | <0.30                       | <0.60                       | <0.30                   |
|                | Bismuth (Bi)-Total (mg/kg wwt)    |                                                                       | <0.030                   | <0.030                  | <0.030                      | <0.060                      | <0.030                  |
|                | Cadmium (Cd)-Total (mg/kg)        |                                                                       | 0.150                    | 0.454                   | 0.862                       | 0.876                       | 0.173                   |
|                | Cadmium (Cd)-Total (mg/kg wwt)    |                                                                       | 0.0447                   | 0.103                   | 0.209                       | 0.225                       | 0.0537                  |
|                | Calcium (Ca)-Total (mg/kg)        |                                                                       | 39100                    | 51800                   | 50000                       | 58700                       | 24600                   |
|                | Calcium (Ca)-Total (mg/kg wwt)    |                                                                       | 11700                    | 11700                   | 12100                       | 15100                       | 7600                    |
|                | Chromium (Cr)-Total (mg/kg)       |                                                                       | 1.94                     | 5.64                    | 4.66                        | 9.7                         | 1.95                    |
|                | Chromium (Cr)-Total (mg/kg wwt)   |                                                                       | 0.58                     | 1.28                    | 1.13                        | 2.48                        | 0.60                    |
|                | Cobalt (Co)-Total (mg/kg)         |                                                                       | 0.38                     | 0.19                    | 0.18                        | 1.15                        | 0.12                    |
|                | Cobalt (Co)-Total (mg/kg wwt)     |                                                                       | 0.114                    | 0.043                   | 0.044                       | 0.294                       | 0.038                   |
|                | Copper (Cu)-Total (mg/kg)         |                                                                       | 2.15                     | 6.91                    | 14.6                        | 35.7                        | 2.54                    |
|                | Copper (Cu)-Total (mg/kg wwt)     |                                                                       | 0.640                    | 1.56                    | 3.53                        | 9.16                        | 0.786                   |
|                | Lead (Pb)-Total (mg/kg)           |                                                                       | 2.04                     | 0.30                    | 0.30                        | 0.50                        | 0.17                    |
|                | Lead (Pb)-Total (mg/kg wwt)       |                                                                       | 0.607                    | 0.068                   | 0.074                       | 0.129                       | 0.053                   |
|                | Lithium (Li)-Total (mg/kg)        |                                                                       | <0.50                    | <0.50                   | <0.50                       | <1.0                        | <0.50                   |
|                | Lithium (Li)-Total (mg/kg wwt)    |                                                                       | <0.10                    | <0.10                   | <0.10                       | <0.20                       | <0.10                   |
|                | Magnesium (Mg)-Total (mg/kg)      |                                                                       | 1350                     | 1860                    | 1730                        | 1980                        | 1060                    |
|                | Magnesium (Mg)-Total (mg/kg wwt)  |                                                                       | 403                      | 421                     | 419                         | 507                         | 328                     |
|                | Manganese (Mn)-Total (mg/kg)      |                                                                       | 96.1                     | 72.8                    | 57.6                        | 190                         | 73.5                    |
|                | Manganese (Mn)-Total (mg/kg wwt)  |                                                                       | 28.7                     | 16.5                    | 14.0                        | 48.8                        | 22.8                    |
|                | Mercury (Hg)-Total (mg/kg)        |                                                                       | 0.0166                   | 0.606                   | 0.0801                      | 0.0851                      | 0.199                   |
|                | Mercury (Hg)-Total (mg/kg wwt)    |                                                                       | 0.0049                   | 0.137                   | 0.0194                      | 0.0218                      | 0.0617                  |
|                | Molybdenum (Mo)-Total (mg/kg)     |                                                                       | 0.126                    | 0.768                   | 0.471                       | 1.42                        | 0.178                   |
|                | Molybdenum (Mo)-Total (mg/kg wwt) |                                                                       | 0.038                    | 0.174                   | 0.114                       | 0.363                       | 0.055                   |
|                | Nickel (Ni)-Total (mg/kg)         |                                                                       | 0.88                     | 2.93                    | 2.70                        | 5.3                         | 0.96                    |
|                | Nickel (Ni)-Total (mg/kg wwt)     |                                                                       | 0.26                     | 0.66                    | 0.65                        | 1.35                        | 0.30                    |
|                | Selenium (Se)-Total (mg/kg)       |                                                                       | 0.60                     | 1.12                    | 0.44                        | 0.57                        | 1.27                    |
|                | Selenium (Se)-Total (mg/kg wwt)   |                                                                       | 0.180                    | 0.253                   | 0.106                       | 0.147                       | 0.393                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                  | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-41           | L677662-42                  | L677662-43            | L677662-44            | L677662-45                   |
|----------------|----------------------------------|-----------------------------------------------------------------------|----------------------|-----------------------------|-----------------------|-----------------------|------------------------------|
| Grouping       |                                  | Analyte                                                               | BRYCON<br>17.6CM MF1 | BRYCON<br>16.3CM TL<br>BFH1 | BRYCON 16CM<br>TL MF1 | BRYCON 14CM<br>TL MF1 | BRYCON<br>13.2CM TL<br>H4/W4 |
| TISSUE         |                                  |                                                                       |                      |                             |                       |                       |                              |
| Physical Tests | % Moisture (%)                   |                                                                       | 78.3                 | 74.2                        | 75.8                  | 73.4                  | 78.3                         |
| Metals         | Aluminum (Al)-Total (mg/kg)      |                                                                       | 779                  | 57                          | 99                    | 172                   | 237                          |
|                | Aluminum (Al)-Total (mg/kg ww)   |                                                                       | 169                  | 14.6                        | 24.0                  | 45.7                  | 51.3                         |
|                | Antimony (Sb)-Total (mg/kg)      |                                                                       | <0.050               | <0.050                      | <0.050                | <0.050                | <0.050                       |
|                | Antimony (Sb)-Total (mg/kg ww)   |                                                                       | <0.010               | <0.010                      | <0.010                | <0.010                | <0.010                       |
|                | Arsenic (As)-Total (mg/kg)       |                                                                       | 0.078                | <0.050                      | <0.050                | 0.059                 | 1.01                         |
|                | Arsenic (As)-Total (mg/kg ww)    |                                                                       | 0.017                | <0.010                      | <0.010                | 0.016                 | 0.218                        |
|                | Barium (Ba)-Total (mg/kg)        |                                                                       | 15.0                 | 9.06                        | 14.1                  | 13.5                  | 12.5                         |
|                | Barium (Ba)-Total (mg/kg ww)     |                                                                       | 3.26                 | 2.33                        | 3.40                  | 3.58                  | 2.71                         |
|                | Beryllium (Be)-Total (mg/kg)     |                                                                       | <0.30                | <0.30                       | <0.30                 | <0.30                 | <0.30                        |
|                | Beryllium (Be)-Total (mg/kg ww)  |                                                                       | <0.10                | <0.10                       | <0.10                 | <0.10                 | <0.10                        |
|                | Bismuth (Bi)-Total (mg/kg)       |                                                                       | <0.30                | <0.30                       | <0.30                 | <0.30                 | <0.30                        |
|                | Bismuth (Bi)-Total (mg/kg ww)    |                                                                       | <0.030               | <0.030                      | <0.030                | <0.030                | <0.030                       |
|                | Cadmium (Cd)-Total (mg/kg)       |                                                                       | 0.595                | 0.735                       | 0.329                 | 0.318                 | 0.089                        |
|                | Cadmium (Cd)-Total (mg/kg ww)    |                                                                       | 0.129                | 0.189                       | 0.0796                | 0.0844                | 0.0193                       |
|                | Calcium (Ca)-Total (mg/kg)       |                                                                       | 52500                | 33800                       | 47200                 | 43800                 | 41800                        |
|                | Calcium (Ca)-Total (mg/kg ww)    |                                                                       | 11400                | 8690                        | 11400                 | 11600                 | 9070                         |
|                | Chromium (Cr)-Total (mg/kg)      |                                                                       | 5.68                 | 2.97                        | 12.1                  | 2.95                  | 2.04                         |
|                | Chromium (Cr)-Total (mg/kg ww)   |                                                                       | 1.23                 | 0.76                        | 2.92                  | 0.78                  | 0.44                         |
|                | Cobalt (Co)-Total (mg/kg)        |                                                                       | 0.33                 | <0.10                       | 0.30                  | <0.10                 | 0.20                         |
|                | Cobalt (Co)-Total (mg/kg ww)     |                                                                       | 0.072                | <0.020                      | 0.073                 | 0.025                 | 0.044                        |
|                | Copper (Cu)-Total (mg/kg)        |                                                                       | 4.64                 | 3.98                        | 2.32                  | 4.84                  | 3.08                         |
|                | Copper (Cu)-Total (mg/kg ww)     |                                                                       | 1.01                 | 1.03                        | 0.561                 | 1.29                  | 0.668                        |
|                | Lead (Pb)-Total (mg/kg)          |                                                                       | 0.28                 | 0.27                        | 0.40                  | 0.22                  | 0.38                         |
|                | Lead (Pb)-Total (mg/kg ww)       |                                                                       | 0.061                | 0.070                       | 0.096                 | 0.058                 | 0.081                        |
|                | Lithium (Li)-Total (mg/kg)       |                                                                       | <0.50                | <0.50                       | <0.50                 | <0.50                 | <0.50                        |
|                | Lithium (Li)-Total (mg/kg ww)    |                                                                       | <0.10                | <0.10                       | <0.10                 | <0.10                 | <0.10                        |
|                | Magnesium (Mg)-Total (mg/kg)     |                                                                       | 1690                 | 1230                        | 1450                  | 1590                  | 1660                         |
|                | Magnesium (Mg)-Total (mg/kg ww)  |                                                                       | 366                  | 316                         | 351                   | 423                   | 359                          |
|                | Manganese (Mn)-Total (mg/kg)     |                                                                       | 109                  | 49.9                        | 87.2                  | 70.4                  | 111                          |
|                | Manganese (Mn)-Total (mg/kg ww)  |                                                                       | 23.7                 | 12.9                        | 21.1                  | 18.7                  | 24.1                         |
|                | Mercury (Hg)-Total (mg/kg)       |                                                                       | 0.241                | 0.0788                      | 0.421                 | 0.128                 | 0.122                        |
|                | Mercury (Hg)-Total (mg/kg ww)    |                                                                       | 0.0524               | 0.0203                      | 0.102                 | 0.0339                | 0.0265                       |
|                | Molybdenum (Mo)-Total (mg/kg)    |                                                                       | 0.416                | 0.311                       | 0.951                 | 0.275                 | 0.172                        |
|                | Molybdenum (Mo)-Total (mg/kg ww) |                                                                       | 0.090                | 0.080                       | 0.230                 | 0.073                 | 0.037                        |
|                | Nickel (Ni)-Total (mg/kg)        |                                                                       | 2.76                 | 1.49                        | 6.32                  | 1.44                  | 1.08                         |
|                | Nickel (Ni)-Total (mg/kg ww)     |                                                                       | 0.60                 | 0.38                        | 1.53                  | 0.38                  | 0.23                         |
|                | Selenium (Se)-Total (mg/kg)      |                                                                       | 1.03                 | 0.94                        | 0.77                  | 0.81                  | 1.58                         |
|                | Selenium (Se)-Total (mg/kg ww)   |                                                                       | 0.225                | 0.242                       | 0.185                 | 0.216                 | 0.343                        |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-46            | L677662-47              | L677662-48                          | L677662-49                       | L677662-50                        |
|----------------|-----------------------------------|-----------------------------------------------------------------------|-----------------------|-------------------------|-------------------------------------|----------------------------------|-----------------------------------|
| Grouping       |                                   | Analyte                                                               | BRYCON 16cm<br>TL MF1 | BRYCON<br>17.2CM TL RF1 | CARANX<br>LOTUS 32.1CM<br>RL 620.0G | CARANX<br>LATUS 21.6CM<br>FL CF1 | CARANX<br>CRISUS 27.5CM<br>349.0G |
| TISSUE         |                                   |                                                                       |                       |                         | "CAIMITO"                           | "CAIMITO"                        | "CAIMITO"                         |
| Physical Tests | % Moisture (%)                    |                                                                       | 78.8                  | 71.0                    | 72.0                                | 74.2                             | 73.5                              |
| Metals         | Aluminum (Al)-Total (mg/kg)       |                                                                       | 188                   | 14                      | 42                                  | 22                               | 31                                |
|                | Aluminum (Al)-Total (mg/kg wwt)   |                                                                       | 39.9                  | 3.9                     | 11.7                                | 5.7                              | 8.1                               |
|                | Antimony (Sb)-Total (mg/kg)       |                                                                       | <0.050                | <0.050                  | <0.10                               | <0.050                           | <0.10                             |
|                | Antimony (Sb)-Total (mg/kg wwt)   |                                                                       | <0.010                | <0.010                  | <0.020                              | <0.010                           | <0.020                            |
|                | Arsenic (As)-Total (mg/kg)        |                                                                       | <0.050                | 0.500                   | 2.72                                | 2.46                             | 4.65                              |
|                | Arsenic (As)-Total (mg/kg wwt)    |                                                                       | <0.010                | 0.145                   | 0.763                               | 0.633                            | 1.23                              |
|                | Barium (Ba)-Total (mg/kg)         |                                                                       | 9.77                  | 5.73                    | 1.69                                | 11.3                             | 2.10                              |
|                | Barium (Ba)-Total (mg/kg wwt)     |                                                                       | 2.07                  | 1.66                    | 0.472                               | 2.92                             | 0.557                             |
|                | Beryllium (Be)-Total (mg/kg)      |                                                                       | <0.30                 | <0.30                   | <0.60                               | <0.30                            | <0.60                             |
|                | Beryllium (Be)-Total (mg/kg wwt)  |                                                                       | <0.10                 | <0.10                   | <0.20                               | <0.10                            | <0.20                             |
|                | Bismuth (Bi)-Total (mg/kg)        |                                                                       | <0.30                 | <0.30                   | <0.60                               | <0.30                            | <0.60                             |
|                | Bismuth (Bi)-Total (mg/kg wwt)    |                                                                       | <0.030                | <0.030                  | <0.060                              | <0.030                           | <0.060                            |
|                | Cadmium (Cd)-Total (mg/kg)        |                                                                       | 0.363                 | 0.364                   | <0.060                              | 0.051                            | 0.154                             |
|                | Cadmium (Cd)-Total (mg/kg wwt)    |                                                                       | 0.0771                | 0.106                   | <0.010                              | 0.0132                           | 0.041                             |
|                | Calcium (Ca)-Total (mg/kg)        |                                                                       | 38700                 | 20900                   | 45500                               | 29100                            | 46200                             |
|                | Calcium (Ca)-Total (mg/kg wwt)    |                                                                       | 8220                  | 6060                    | 12800                               | 7500                             | 12200                             |
|                | Chromium (Cr)-Total (mg/kg)       |                                                                       | 4.63                  | 1.65                    | <1.0                                | 3.85                             | 2.2                               |
|                | Chromium (Cr)-Total (mg/kg wwt)   |                                                                       | 0.98                  | 0.48                    | <0.20                               | 0.99                             | 0.58                              |
|                | Cobalt (Co)-Total (mg/kg)         |                                                                       | 0.18                  | <0.10                   | <0.20                               | 0.11                             | <0.20                             |
|                | Cobalt (Co)-Total (mg/kg wwt)     |                                                                       | 0.038                 | <0.020                  | <0.040                              | 0.028                            | <0.040                            |
|                | Copper (Cu)-Total (mg/kg)         |                                                                       | 2.91                  | 2.55                    | 1.85                                | 2.39                             | 2.76                              |
|                | Copper (Cu)-Total (mg/kg wwt)     |                                                                       | 0.618                 | 0.738                   | 0.518                               | 0.615                            | 0.731                             |
|                | Lead (Pb)-Total (mg/kg)           |                                                                       | 0.26                  | <0.10                   | <0.20                               | 0.51                             | <0.20                             |
|                | Lead (Pb)-Total (mg/kg wwt)       |                                                                       | 0.056                 | <0.020                  | <0.040                              | 0.132                            | <0.040                            |
|                | Lithium (Li)-Total (mg/kg)        |                                                                       | <0.50                 | <0.50                   | <1.0                                | <0.50                            | <1.0                              |
|                | Lithium (Li)-Total (mg/kg wwt)    |                                                                       | <0.10                 | <0.10                   | <0.20                               | <0.10                            | <0.20                             |
|                | Magnesium (Mg)-Total (mg/kg)      |                                                                       | 1480                  | 1180                    | 1600                                | 1260                             | 1750                              |
|                | Magnesium (Mg)-Total (mg/kg wwt)  |                                                                       | 314                   | 342                     | 449                                 | 325                              | 463                               |
|                | Manganese (Mn)-Total (mg/kg)      |                                                                       | 69.1                  | 16.8                    | 4.21                                | 7.29                             | 3.37                              |
|                | Manganese (Mn)-Total (mg/kg wwt)  |                                                                       | 14.7                  | 4.88                    | 1.18                                | 1.88                             | 0.891                             |
|                | Mercury (Hg)-Total (mg/kg)        |                                                                       | 0.102                 | 0.034                   | 0.156                               | 0.155                            | 0.525                             |
|                | Mercury (Hg)-Total (mg/kg wwt)    |                                                                       | 0.0216                | 0.0098                  | 0.0436                              | 0.0400                           | 0.139                             |
|                | Molybdenum (Mo)-Total (mg/kg)     |                                                                       | 0.388                 | 0.131                   | <0.10                               | 0.329                            | 0.23                              |
|                | Molybdenum (Mo)-Total (mg/kg wwt) |                                                                       | 0.082                 | 0.038                   | 0.027                               | 0.085                            | 0.060                             |
|                | Nickel (Ni)-Total (mg/kg)         |                                                                       | 2.41                  | 0.78                    | <1.0                                | 2.36                             | 1.2                               |
|                | Nickel (Ni)-Total (mg/kg wwt)     |                                                                       | 0.51                  | 0.23                    | 0.21                                | 0.61                             | 0.33                              |
|                | Selenium (Se)-Total (mg/kg)       |                                                                       | 0.76                  | 1.73                    | 2.11                                | 2.07                             | 3.73                              |
|                | Selenium (Se)-Total (mg/kg wwt)   |                                                                       | 0.162                 | 0.500                   | 0.592                               | 0.534                            | 0.989                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-51<br><br>10-MAR-08<br><br>CARANX<br>CRISUS 30.0CM<br>449.3G<br>"CAIMITO" |  |  |  |  |
|----------------|-----------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|--|--|
| Grouping       | Analyte                           |                                                                       |                                                                                   |  |  |  |  |
| TISSUE         |                                   |                                                                       |                                                                                   |  |  |  |  |
| Physical Tests | % Moisture (%)                    | 72.0                                                                  |                                                                                   |  |  |  |  |
| Metals         | Aluminum (Al)-Total (mg/kg)       | 15                                                                    |                                                                                   |  |  |  |  |
|                | Aluminum (Al)-Total (mg/kg wwt)   | 4.3                                                                   |                                                                                   |  |  |  |  |
|                | Antimony (Sb)-Total (mg/kg)       | <0.050                                                                |                                                                                   |  |  |  |  |
|                | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                                                                |                                                                                   |  |  |  |  |
|                | Arsenic (As)-Total (mg/kg)        | 4.25                                                                  |                                                                                   |  |  |  |  |
|                | Arsenic (As)-Total (mg/kg wwt)    | 1.19                                                                  |                                                                                   |  |  |  |  |
|                | Barium (Ba)-Total (mg/kg)         | 1.01                                                                  |                                                                                   |  |  |  |  |
|                | Barium (Ba)-Total (mg/kg wwt)     | 0.283                                                                 |                                                                                   |  |  |  |  |
|                | Beryllium (Be)-Total (mg/kg)      | <0.30                                                                 |                                                                                   |  |  |  |  |
|                | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                                                 |                                                                                   |  |  |  |  |
|                | Bismuth (Bi)-Total (mg/kg)        | <0.30                                                                 |                                                                                   |  |  |  |  |
|                | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                                                                |                                                                                   |  |  |  |  |
|                | Cadmium (Cd)-Total (mg/kg)        | 0.052                                                                 |                                                                                   |  |  |  |  |
|                | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0145                                                                |                                                                                   |  |  |  |  |
|                | Calcium (Ca)-Total (mg/kg)        | 30900                                                                 |                                                                                   |  |  |  |  |
|                | Calcium (Ca)-Total (mg/kg wwt)    | 8660                                                                  |                                                                                   |  |  |  |  |
|                | Chromium (Cr)-Total (mg/kg)       | <0.50                                                                 |                                                                                   |  |  |  |  |
|                | Chromium (Cr)-Total (mg/kg wwt)   | 0.11                                                                  |                                                                                   |  |  |  |  |
|                | Cobalt (Co)-Total (mg/kg)         | <0.10                                                                 |                                                                                   |  |  |  |  |
|                | Cobalt (Co)-Total (mg/kg wwt)     | <0.020                                                                |                                                                                   |  |  |  |  |
|                | Copper (Cu)-Total (mg/kg)         | 3.25                                                                  |                                                                                   |  |  |  |  |
|                | Copper (Cu)-Total (mg/kg wwt)     | 0.911                                                                 |                                                                                   |  |  |  |  |
|                | Lead (Pb)-Total (mg/kg)           | <0.10                                                                 |                                                                                   |  |  |  |  |
|                | Lead (Pb)-Total (mg/kg wwt)       | <0.020                                                                |                                                                                   |  |  |  |  |
|                | Lithium (Li)-Total (mg/kg)        | <0.50                                                                 |                                                                                   |  |  |  |  |
|                | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                                                 |                                                                                   |  |  |  |  |
|                | Magnesium (Mg)-Total (mg/kg)      | 1460                                                                  |                                                                                   |  |  |  |  |
|                | Magnesium (Mg)-Total (mg/kg wwt)  | 408                                                                   |                                                                                   |  |  |  |  |
|                | Manganese (Mn)-Total (mg/kg)      | 3.66                                                                  |                                                                                   |  |  |  |  |
|                | Manganese (Mn)-Total (mg/kg wwt)  | 1.02                                                                  |                                                                                   |  |  |  |  |
|                | Mercury (Hg)-Total (mg/kg)        | 0.418                                                                 |                                                                                   |  |  |  |  |
|                | Mercury (Hg)-Total (mg/kg wwt)    | 0.117                                                                 |                                                                                   |  |  |  |  |
|                | Molybdenum (Mo)-Total (mg/kg)     | 0.069                                                                 |                                                                                   |  |  |  |  |
|                | Molybdenum (Mo)-Total (mg/kg wwt) | 0.019                                                                 |                                                                                   |  |  |  |  |
|                | Nickel (Ni)-Total (mg/kg)         | <0.50                                                                 |                                                                                   |  |  |  |  |
|                | Nickel (Ni)-Total (mg/kg wwt)     | <0.10                                                                 |                                                                                   |  |  |  |  |
|                | Selenium (Se)-Total (mg/kg)       | 3.28                                                                  |                                                                                   |  |  |  |  |
|                | Selenium (Se)-Total (mg/kg wwt)   | 0.918                                                                 |                                                                                   |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                             | Sample ID    | L677662-1          | L677662-2            | L677662-3              | L677662-4                 | L677662-5                 |
|----------------------------------|---------------------------------------------|--------------|--------------------|----------------------|------------------------|---------------------------|---------------------------|
|                                  |                                             | Description  |                    |                      |                        |                           |                           |
|                                  |                                             | Sampled Date | 17-MAR-08          | 17-MAR-08            | 16-MAR-08              | 11-MAR-08                 | 11-MAR-08                 |
|                                  |                                             | Sampled Time |                    |                      |                        |                           |                           |
|                                  |                                             | Client ID    | GUABINA 20CM TL W7 | GUABINA 22.4CM TL W7 | GUABINA 16.1cm TL SJF1 | CAIMITO 20CM TL "GUABINA" | G. DORMITOR 14.4CM TL CF1 |
| Grouping                         | Analyte                                     |              |                    |                      |                        |                           |                           |
| <b>TISSUE</b>                    |                                             |              |                    |                      |                        |                           |                           |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)                |              | 122                | 139                  | 135                    | 260                       | 231                       |
|                                  | Strontium (Sr)-Total (mg/kg wwt)            |              | 28.7               | 32.2                 | 33.4                   | 62.3                      | 58.8                      |
|                                  | Thallium (Tl)-Total (mg/kg)                 |              | <0.030             | <0.030               | <0.030                 | <0.030                    | <0.030                    |
|                                  | Thallium (Tl)-Total (mg/kg wwt)             |              | <0.010             | <0.010               | <0.010                 | <0.010                    | <0.010                    |
|                                  | Tin (Sn)-Total (mg/kg)                      |              | <0.20              | 0.23                 | <0.20                  | <0.20                     | <0.20                     |
|                                  | Tin (Sn)-Total (mg/kg wwt)                  |              | <0.050             | 0.053                | <0.050                 | <0.050                    | <0.050                    |
|                                  | Uranium (U)-Total (mg/kg)                   |              | <0.010             | <0.010               | <0.010                 | <0.010                    | <0.010                    |
|                                  | Uranium (U)-Total (mg/kg wwt)               |              | <0.0020            | <0.0020              | <0.0020                | <0.0020                   | <0.0020                   |
|                                  | Vanadium (V)-Total (mg/kg)                  |              | <0.50              | <0.50                | <0.50                  | <0.50                     | <0.50                     |
|                                  | Vanadium (V)-Total (mg/kg wwt)              |              | <0.10              | <0.10                | <0.10                  | <0.10                     | <0.10                     |
|                                  | Zinc (Zn)-Total (mg/kg)                     |              | 90.9               | 89.7                 | 75.9                   | 69.9                      | 67.1                      |
|                                  | Zinc (Zn)-Total (mg/kg wwt)                 |              | 21.4               | 20.7                 | 18.8                   | 16.7                      | 17.1                      |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1016 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1221 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1221 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1232 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1232 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1242 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1242 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1248 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1248 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1254 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1254 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1260 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1260 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1262 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1262 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | PCB-1268 (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | PCB-1268 (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |
|                                  | Total Polychlorinated Biphenyls (mg/kg)     |              |                    |                      |                        |                           |                           |
|                                  | Total Polychlorinated Biphenyls (mg/kg wwt) |              |                    |                      |                        |                           |                           |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                              |              |                    |                      |                        |                           |                           |
|                                  | Aldrin (mg/kg wwt)                          |              |                    |                      |                        |                           |                           |
|                                  | alpha-BHC (mg/kg)                           |              |                    |                      |                        |                           |                           |
|                                  | alpha-BHC (mg/kg wwt)                       |              |                    |                      |                        |                           |                           |
|                                  | beta-BHC (mg/kg)                            |              |                    |                      |                        |                           |                           |
|                                  | beta-BHC (mg/kg wwt)                        |              |                    |                      |                        |                           |                           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                            | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-6                     | L677662-7                                | L677662-8                | L677662-9                     | L677662-10                    |
|--------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|-------------------------------|------------------------------------------|--------------------------|-------------------------------|-------------------------------|
| Grouping                             | Analyte                                    |                                                                       | GUABINA 15CM<br>TL HF1 "HOJA" | GUABINA<br>15.4CM TL PF1<br>"PATAQUILLA" | GUABINA<br>25.1CM TL PF1 | GUABINA<br>21.8CM TL<br>H4/W4 | GUABINA<br>20.4CM TL<br>H4/W4 |
| <b>TISSUE</b>                        |                                            |                                                                       |                               |                                          |                          |                               |                               |
| <b>Metals</b>                        | Strontium (Sr)-Total (mg/kg)               |                                                                       | 238                           | 159                                      | 110                      | 127                           | 125                           |
|                                      | Strontium (Sr)-Total (mg/kg ww)            |                                                                       | 55.6                          | 38.3                                     | 28.8                     | 32.2                          | 32.9                          |
|                                      | Thallium (Tl)-Total (mg/kg)                |                                                                       | <0.030                        | <0.030                                   | <0.030                   | <0.060                        | <0.030                        |
|                                      | Thallium (Tl)-Total (mg/kg ww)             |                                                                       | <0.010                        | <0.010                                   | <0.010                   | <0.020                        | <0.010                        |
|                                      | Tin (Sn)-Total (mg/kg)                     |                                                                       | <0.20                         | <0.20                                    | <0.20                    | <0.40                         | <0.20                         |
|                                      | Tin (Sn)-Total (mg/kg ww)                  |                                                                       | <0.050                        | <0.050                                   | <0.050                   | <0.10                         | <0.050                        |
|                                      | Uranium (U)-Total (mg/kg)                  |                                                                       | <0.010                        | <0.010                                   | <0.010                   | <0.020                        | <0.010                        |
|                                      | Uranium (U)-Total (mg/kg ww)               |                                                                       | <0.0020                       | <0.0020                                  | <0.0020                  | <0.0040                       | <0.0020                       |
|                                      | Vanadium (V)-Total (mg/kg)                 |                                                                       | 0.67                          | <0.50                                    | <0.50                    | <1.0                          | 0.55                          |
|                                      | Vanadium (V)-Total (mg/kg ww)              |                                                                       | 0.16                          | <0.10                                    | <0.10                    | <0.20                         | 0.14                          |
|                                      | Zinc (Zn)-Total (mg/kg)                    |                                                                       | 72.9                          | 67.5                                     | 71.4                     | 94.6                          | 75.8                          |
|                                      | Zinc (Zn)-Total (mg/kg ww)                 |                                                                       | 17.0                          | 16.2                                     | 18.6                     | 24.0                          | 19.9                          |
| <b>Polychlorinated<br/>Biphenyls</b> | PCB-1016 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1016 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1221 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1221 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1232 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1232 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1242 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1242 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1248 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1248 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1254 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1254 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1260 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1260 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1262 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1262 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | PCB-1268 (mg/kg)                           |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | PCB-1268 (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.050                        |                               |
|                                      | Total Polychlorinated Biphenyls (mg/kg)    |                                                                       |                               |                                          |                          | <0.25                         |                               |
|                                      | Total Polychlorinated Biphenyls (mg/kg ww) |                                                                       |                               |                                          |                          | <0.050                        |                               |
| <b>Organochlorine<br/>Pesticides</b> | Aldrin (mg/kg)                             |                                                                       |                               |                                          |                          | <1.0                          |                               |
|                                      | Aldrin (mg/kg ww)                          |                                                                       |                               |                                          |                          | <0.20                         |                               |
|                                      | alpha-BHC (mg/kg)                          |                                                                       |                               |                                          |                          | <1.0                          |                               |
|                                      | alpha-BHC (mg/kg ww)                       |                                                                       |                               |                                          |                          | <0.20                         |                               |
|                                      | beta-BHC (mg/kg)                           |                                                                       |                               |                                          |                          | <1.0                          |                               |
|                                      | beta-BHC (mg/kg ww)                        |                                                                       |                               |                                          |                          | <0.20                         |                               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-11                         | L677662-12                    | L677662-13                            | L677662-14                                    | L677662-15                               |
|--------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|------------------------------------|-------------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------|
| Grouping                             | Analyte                                     |                                                                       | CAIMITO<br>13.5CM CF2<br>"GUABINA" | G. DORIMITOR<br>10.2CM TL CF1 | CAIMITO<br>20.2CM TL CF2<br>"GUABINA" | G. DORIMITOR<br>15.7CM TL RF1<br>"RINCONCITO" | GUABINA<br>20.6CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>                        |                                             |                                                                       |                                    |                               |                                       |                                               |                                          |
| <b>Metals</b>                        | Strontium (Sr)-Total (mg/kg)                |                                                                       | 327                                | 246                           | 237                                   | 197                                           | 126                                      |
|                                      | Strontium (Sr)-Total (mg/kg wwt)            |                                                                       | 74.6                               | 63.6                          | 54.2                                  | 54.0                                          | 28.0                                     |
|                                      | Thallium (Tl)-Total (mg/kg)                 |                                                                       | <0.030                             | <0.060                        | <0.060                                | <0.060                                        | <0.030                                   |
|                                      | Thallium (Tl)-Total (mg/kg wwt)             |                                                                       | <0.010                             | <0.020                        | <0.020                                | <0.020                                        | <0.010                                   |
|                                      | Tin (Sn)-Total (mg/kg)                      |                                                                       | <0.20                              | <0.40                         | <0.40                                 | <0.40                                         | <0.20                                    |
|                                      | Tin (Sn)-Total (mg/kg wwt)                  |                                                                       | <0.050                             | <0.10                         | <0.10                                 | <0.10                                         | <0.050                                   |
|                                      | Uranium (U)-Total (mg/kg)                   |                                                                       | <0.010                             | <0.020                        | <0.020                                | <0.020                                        | <0.010                                   |
|                                      | Uranium (U)-Total (mg/kg wwt)               |                                                                       | <0.0020                            | <0.0040                       | <0.0040                               | <0.0040                                       | <0.0020                                  |
|                                      | Vanadium (V)-Total (mg/kg)                  |                                                                       | <0.50                              | 1.0                           | <1.0                                  | <1.0                                          | <0.50                                    |
|                                      | Vanadium (V)-Total (mg/kg wwt)              |                                                                       | <0.10                              | 0.26                          | <0.20                                 | <0.20                                         | <0.10                                    |
|                                      | Zinc (Zn)-Total (mg/kg)                     |                                                                       | 76.7                               | 103                           | 101                                   | 118                                           | 75.6                                     |
|                                      | Zinc (Zn)-Total (mg/kg wwt)                 |                                                                       | 17.5                               | 26.7                          | 23.1                                  | 32.4                                          | 16.8                                     |
| <b>Polychlorinated<br/>Biphenyls</b> | PCB-1016 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1016 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1221 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1221 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1232 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1232 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1242 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1242 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1248 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1248 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1254 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1254 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1260 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1260 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1262 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1262 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1268 (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | PCB-1268 (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       |                                    |                               |                                       |                                               |                                          |
| <b>Organochlorine<br/>Pesticides</b> | Aldrin (mg/kg)                              |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Aldrin (mg/kg wwt)                          |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | alpha-BHC (mg/kg)                           |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | alpha-BHC (mg/kg wwt)                       |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | beta-BHC (mg/kg)                            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | beta-BHC (mg/kg wwt)                        |                                                                       |                                    |                               |                                       |                                               |                                          |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                            | Sample ID    | L677662-16  | L677662-17                    | L677662-18    | L677662-19   | L677662-20                    |
|----------------------------------|--------------------------------------------|--------------|-------------|-------------------------------|---------------|--------------|-------------------------------|
|                                  |                                            | Description  |             |                               |               |              |                               |
|                                  |                                            | Sampled Date | 16-MAR-08   | 14-MAR-08                     | 14-MAR-08     | 17-MAR-08    | 14-MAR-08                     |
|                                  |                                            | Sampled Time |             |                               |               |              |                               |
|                                  |                                            | Client ID    | GUABINA     | GUABINA                       | GUABINA       | GUABINA      | GUABINA                       |
| Grouping                         | Analyte                                    |              | 22.8CM SJF1 | 16.4CM TL PF1<br>"PETAQUILLA" | 17.6CM TL PF1 | 19.1CM TL W7 | 23.4CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>                    |                                            |              |             |                               |               |              |                               |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)               |              | 124         | 161                           | 152           | 147          | 191                           |
|                                  | Strontium (Sr)-Total (mg/kg ww)            |              | 31.1        | 41.4                          | 38.9          | 36.3         | 40.6                          |
|                                  | Thallium (Tl)-Total (mg/kg)                |              | <0.030      | <0.030                        | <0.030        | <0.060       | <0.030                        |
|                                  | Thallium (Tl)-Total (mg/kg ww)             |              | <0.010      | <0.010                        | <0.010        | <0.020       | <0.010                        |
|                                  | Tin (Sn)-Total (mg/kg)                     |              | 0.22        | <0.20                         | <0.20         | <0.40        | <0.20                         |
|                                  | Tin (Sn)-Total (mg/kg ww)                  |              | 0.055       | <0.050                        | <0.050        | <0.10        | <0.050                        |
|                                  | Uranium (U)-Total (mg/kg)                  |              | <0.010      | <0.010                        | <0.010        | <0.020       | <0.010                        |
|                                  | Uranium (U)-Total (mg/kg ww)               |              | <0.0020     | <0.0020                       | <0.0020       | <0.0040      | <0.0020                       |
|                                  | Vanadium (V)-Total (mg/kg)                 |              | <0.50       | <0.50                         | <0.50         | <1.0         | <0.50                         |
|                                  | Vanadium (V)-Total (mg/kg ww)              |              | <0.10       | <0.10                         | <0.10         | <0.20        | <0.10                         |
|                                  | Zinc (Zn)-Total (mg/kg)                    |              | 80.6        | 71.3                          | 86.1          | 94.8         | 89.8                          |
|                                  | Zinc (Zn)-Total (mg/kg ww)                 |              | 20.2        | 18.3                          | 22.0          | 23.3         | 19.1                          |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1016 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1221 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1221 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1232 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1232 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1242 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1242 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1248 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1248 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1254 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1254 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1260 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1260 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1262 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1262 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | PCB-1268 (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | PCB-1268 (mg/kg ww)                        |              |             |                               |               |              |                               |
|                                  | Total Polychlorinated Biphenyls (mg/kg)    |              |             |                               |               |              |                               |
|                                  | Total Polychlorinated Biphenyls (mg/kg ww) |              |             |                               |               |              |                               |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                             |              |             |                               |               |              |                               |
|                                  | Aldrin (mg/kg ww)                          |              |             |                               |               |              |                               |
|                                  | alpha-BHC (mg/kg)                          |              |             |                               |               |              |                               |
|                                  | alpha-BHC (mg/kg ww)                       |              |             |                               |               |              |                               |
|                                  | beta-BHC (mg/kg)                           |              |             |                               |               |              |                               |
|                                  | beta-BHC (mg/kg ww)                        |              |             |                               |               |              |                               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                             | Sample ID    | L677662-21 | L677662-22   | L677662-23 | L677662-24   | L677662-25    |
|----------------------------------|---------------------------------------------|--------------|------------|--------------|------------|--------------|---------------|
|                                  |                                             | Description  |            |              |            |              |               |
|                                  |                                             | Sampled Date | 14-MAR-08  | 13-MAR-08    | 18-MAR-08  | 13-MAR-08    | 11-MAR-08     |
|                                  |                                             | Sampled Time |            |              |            |              |               |
|                                  |                                             | Client ID    | GUABINA    | GUABINA 19.3 | GUABINA    | GUABINA 16.1 | GUABINA       |
| Grouping                         | Analyte                                     |              | 19.7CM PF1 | TL RF1       | 23.0CM TL  | TL HF1       | 10.6CM TL CF1 |
|                                  |                                             |              | "GUABINA"  | "RINCONCITO" | BFH1       | "GUABINA"    | "CAIMITO"     |
| <b>TISSUE</b>                    |                                             |              |            |              |            |              |               |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)                |              | 206        | 191          | 163        | 221          | 275           |
|                                  | Strontium (Sr)-Total (mg/kg wwt)            |              | 48.8       | 43.3         | 37.1       | 52.7         | 70.9          |
|                                  | Thallium (Tl)-Total (mg/kg)                 |              | <0.060     | <0.030       | <0.060     | <0.030       | <0.060        |
|                                  | Thallium (Tl)-Total (mg/kg wwt)             |              | <0.020     | <0.010       | <0.020     | <0.010       | <0.020        |
|                                  | Tin (Sn)-Total (mg/kg)                      |              | <0.40      | <0.20        | <0.40      | <0.20        | <0.40         |
|                                  | Tin (Sn)-Total (mg/kg wwt)                  |              | <0.10      | <0.050       | <0.10      | <0.050       | <0.10         |
|                                  | Uranium (U)-Total (mg/kg)                   |              | <0.020     | <0.010       | <0.020     | <0.010       | <0.020        |
|                                  | Uranium (U)-Total (mg/kg wwt)               |              | <0.0040    | <0.0020      | <0.0040    | <0.0020      | <0.0040       |
|                                  | Vanadium (V)-Total (mg/kg)                  |              | <1.0       | <0.50        | <1.0       | <0.50        | <1.0          |
|                                  | Vanadium (V)-Total (mg/kg wwt)              |              | <0.20      | <0.10        | <0.20      | 0.11         | <0.20         |
|                                  | Zinc (Zn)-Total (mg/kg)                     |              | 150        | 73.2         | 83.0       | 77.6         | 85.4          |
|                                  | Zinc (Zn)-Total (mg/kg wwt)                 |              | 35.4       | 16.6         | 18.9       | 18.5         | 22.0          |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1016 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1221 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1221 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1232 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1232 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1242 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1242 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1248 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1248 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1254 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1254 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1260 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1260 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1262 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1262 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | PCB-1268 (mg/kg)                            |              |            |              |            |              |               |
|                                  | PCB-1268 (mg/kg wwt)                        |              |            |              |            |              |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg)     |              |            |              |            |              |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg wwt) |              |            |              |            |              |               |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                              |              |            |              |            |              |               |
|                                  | Aldrin (mg/kg wwt)                          |              |            |              |            |              |               |
|                                  | alpha-BHC (mg/kg)                           |              |            |              |            |              |               |
|                                  | alpha-BHC (mg/kg wwt)                       |              |            |              |            |              |               |
|                                  | beta-BHC (mg/kg)                            |              |            |              |            |              |               |
|                                  | beta-BHC (mg/kg wwt)                        |              |            |              |            |              |               |

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|                              |                                             | Sample ID    | L677662-26            | L677662-27                   | L677662-28                | L677662-29                            | L677662-30                  |
|------------------------------|---------------------------------------------|--------------|-----------------------|------------------------------|---------------------------|---------------------------------------|-----------------------------|
|                              |                                             | Description  |                       |                              |                           |                                       |                             |
|                              |                                             | Sampled Date | 13-MAR-08             | 16-MAR-08                    | 11-MAR-08                 | 13-MAR-08                             | 18-MAR-08                   |
|                              |                                             | Sampled Time |                       |                              |                           |                                       |                             |
|                              |                                             | Client ID    | GUABINA HFI<br>"HOJA" | BOCA CHICA<br>14.6CM TL SJF1 | BOCA CHICA<br>18CM FL CF1 | BOCA CHICA<br>19.9CM TL HF1<br>"HOJA" | LORICARDAL<br>9.9CM TL BFH1 |
| Grouping                     | Analyte                                     |              |                       |                              |                           |                                       |                             |
| TISSUE                       |                                             |              |                       |                              |                           |                                       |                             |
| Metals                       | Strontium (Sr)-Total (mg/kg)                | 171          | 164                   | 273                          | 142                       | 40.3                                  |                             |
|                              | Strontium (Sr)-Total (mg/kg wwt)            | 39.8         | 47.0                  | 68.5                         | 39.9                      | 16.3                                  |                             |
|                              | Thallium (Tl)-Total (mg/kg)                 | <0.030       | <0.060                | <0.060                       | <0.030                    | <0.030                                |                             |
|                              | Thallium (Tl)-Total (mg/kg wwt)             | <0.010       | <0.020                | <0.020                       | <0.010                    | <0.010                                |                             |
|                              | Tin (Sn)-Total (mg/kg)                      | <0.20        | <0.40                 | <0.40                        | <0.20                     | <0.20                                 |                             |
|                              | Tin (Sn)-Total (mg/kg wwt)                  | <0.050       | <0.10                 | <0.10                        | <0.050                    | <0.050                                |                             |
|                              | Uranium (U)-Total (mg/kg)                   | <0.010       | <0.020                | 0.033                        | 0.487                     | 0.030                                 |                             |
|                              | Uranium (U)-Total (mg/kg wwt)               | <0.0020      | <0.0040               | 0.0083                       | 0.137                     | 0.0120                                |                             |
|                              | Vanadium (V)-Total (mg/kg)                  | <0.50        | 5.1                   | 7.5                          | 12.2                      | 9.49                                  |                             |
|                              | Vanadium (V)-Total (mg/kg wwt)              | 0.11         | 1.47                  | 1.89                         | 3.44                      | 3.83                                  |                             |
|                              | Zinc (Zn)-Total (mg/kg)                     | 78.5         | 70.0                  | 58.6                         | 57.3                      | 37.1                                  |                             |
|                              | Zinc (Zn)-Total (mg/kg wwt)                 | 18.3         | 20.0                  | 14.7                         | 16.1                      | 15.0                                  |                             |
| Polychlorinated<br>Biphenyls | PCB-1016 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1016 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1221 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1221 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1232 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1232 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1242 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1242 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1248 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1248 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1254 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1254 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1260 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1260 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1262 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1262 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | PCB-1268 (mg/kg)                            |              |                       |                              | <0.25                     |                                       |                             |
|                              | PCB-1268 (mg/kg wwt)                        |              |                       |                              | <0.050                    |                                       |                             |
|                              | Total Polychlorinated Biphenyls (mg/kg)     |              |                       |                              | <0.25                     |                                       |                             |
|                              | Total Polychlorinated Biphenyls (mg/kg wwt) |              |                       |                              | <0.050                    |                                       |                             |
| Organochlorine<br>Pesticides | Aldrin (mg/kg)                              |              |                       |                              | <1.0                      |                                       |                             |
|                              | Aldrin (mg/kg wwt)                          |              |                       |                              | <0.20                     |                                       |                             |
|                              | alpha-BHC (mg/kg)                           |              |                       |                              | <1.0                      |                                       |                             |
|                              | alpha-BHC (mg/kg wwt)                       |              |                       |                              | <0.20                     |                                       |                             |
|                              | beta-BHC (mg/kg)                            |              |                       |                              | <1.0                      |                                       |                             |
|                              | beta-BHC (mg/kg wwt)                        |              |                       |                              | <0.20                     |                                       |                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                             | Sample ID    | L677662-31   | L677662-32     | L677662-33     | L677662-34                   | L677662-35    |
|----------------------------------|---------------------------------------------|--------------|--------------|----------------|----------------|------------------------------|---------------|
|                                  |                                             | Description  |              |                |                |                              |               |
|                                  |                                             | Sampled Date | 18-MAR-08    | 16-MAR-08      | 18-MAR-08      | 13-MAR-08                    | 18-MAR-08     |
|                                  |                                             | Sampled Time |              |                |                |                              |               |
|                                  |                                             | Client ID    | LORICARDAL   | BRYCON         | BRYCON         | BRYCON                       | BRYCON        |
| Grouping                         | Analyte                                     |              | 13CM TL BFH1 | 14.3CM TL SJF1 | 13.4CM TL BFH1 | 14.8CM TL RF1<br>"RICONCITO" | 11.7CM TL MF1 |
| <b>TISSUE</b>                    |                                             |              |              |                |                |                              |               |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)                |              | 277          | 73.9           | 170            | 160                          | 198           |
|                                  | Strontium (Sr)-Total (mg/kg wwt)            |              | 89.7         | 17.7           | 40.9           | 36.8                         | 48.8          |
|                                  | Thallium (Tl)-Total (mg/kg)                 |              | <0.090       | <0.030         | <0.060         | <0.060                       | <0.060        |
|                                  | Thallium (Tl)-Total (mg/kg wwt)             |              | <0.030       | <0.010         | <0.020         | <0.020                       | <0.020        |
|                                  | Tin (Sn)-Total (mg/kg)                      |              | <0.60        | <0.20          | <0.40          | <0.40                        | <0.40         |
|                                  | Tin (Sn)-Total (mg/kg wwt)                  |              | <0.15        | <0.050         | <0.10          | <0.10                        | <0.10         |
|                                  | Uranium (U)-Total (mg/kg)                   |              | 0.041        | <0.010         | <0.020         | <0.020                       | <0.020        |
|                                  | Uranium (U)-Total (mg/kg wwt)               |              | 0.0133       | <0.0020        | <0.0040        | <0.0040                      | <0.0040       |
|                                  | Vanadium (V)-Total (mg/kg)                  |              | 12.0         | 1.59           | <1.0           | <1.0                         | 2.0           |
|                                  | Vanadium (V)-Total (mg/kg wwt)              |              | 3.90         | 0.38           | <0.20          | <0.20                        | 0.50          |
|                                  | Zinc (Zn)-Total (mg/kg)                     |              | 130          | 118            | 109            | 124                          | 128           |
|                                  | Zinc (Zn)-Total (mg/kg wwt)                 |              | 42.0         | 28.4           | 26.2           | 28.4                         | 31.7          |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1016 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1221 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1221 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1232 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1232 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1242 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1242 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1248 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1248 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1254 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1254 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1260 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1260 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1262 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1262 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | PCB-1268 (mg/kg)                            |              |              |                |                |                              |               |
|                                  | PCB-1268 (mg/kg wwt)                        |              |              |                |                |                              |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg)     |              |              |                |                |                              |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg wwt) |              |              |                |                |                              |               |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                              |              |              |                |                |                              |               |
|                                  | Aldrin (mg/kg wwt)                          |              |              |                |                |                              |               |
|                                  | alpha-BHC (mg/kg)                           |              |              |                |                |                              |               |
|                                  | alpha-BHC (mg/kg wwt)                       |              |              |                |                |                              |               |
|                                  | beta-BHC (mg/kg)                            |              |              |                |                |                              |               |
|                                  | beta-BHC (mg/kg wwt)                        |              |              |                |                |                              |               |

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|                                  |                                            | Sample ID    | L677662-36     | L677662-37    | L677662-38     | L677662-39     | L677662-40    |
|----------------------------------|--------------------------------------------|--------------|----------------|---------------|----------------|----------------|---------------|
|                                  |                                            | Description  |                |               |                |                |               |
|                                  |                                            | Sampled Date | 16-MAR-08      | 18-MAR-08     | 18-MAR-08      | 18-MAR-08      | 18-MAR-08     |
|                                  |                                            | Sampled Time |                |               |                |                |               |
|                                  |                                            | Client ID    | BRYCON         | BRYCON        | BRYCON         | BRYCON         | BRYCON        |
| Grouping                         | Analyte                                    |              | 13.3CM TL SJF1 | 15.5CM TL MF1 | 14.8CM TL BFH1 | 13.7CM TL BFH1 | 16.3CM TL MF1 |
| <b>TISSUE</b>                    |                                            |              |                |               |                |                |               |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)               |              | 118            | 131           | 163            | 186            | 59.1          |
|                                  | Strontium (Sr)-Total (mg/kg ww)            |              | 35.3           | 29.6          | 39.5           | 47.8           | 18.3          |
|                                  | Thallium (Tl)-Total (mg/kg)                |              | <0.030         | <0.030        | <0.030         | <0.060         | <0.030        |
|                                  | Thallium (Tl)-Total (mg/kg ww)             |              | <0.010         | <0.010        | <0.010         | <0.020         | <0.010        |
|                                  | Tin (Sn)-Total (mg/kg)                     |              | <0.20          | <0.20         | <0.20          | <0.40          | <0.20         |
|                                  | Tin (Sn)-Total (mg/kg ww)                  |              | <0.050         | <0.050        | <0.050         | <0.10          | <0.050        |
|                                  | Uranium (U)-Total (mg/kg)                  |              | <0.010         | <0.010        | <0.010         | 0.023          | <0.010        |
|                                  | Uranium (U)-Total (mg/kg ww)               |              | <0.0020        | <0.0020       | <0.0020        | 0.0059         | <0.0020       |
|                                  | Vanadium (V)-Total (mg/kg)                 |              | 0.83           | 0.98          | 0.61           | 5.0            | 1.76          |
|                                  | Vanadium (V)-Total (mg/kg ww)              |              | 0.25           | 0.22          | 0.15           | 1.28           | 0.55          |
|                                  | Zinc (Zn)-Total (mg/kg)                    |              | 76.6           | 116           | 99.2           | 127            | 60.2          |
|                                  | Zinc (Zn)-Total (mg/kg ww)                 |              | 22.8           | 26.3          | 24.0           | 32.6           | 18.6          |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1016 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1221 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1221 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1232 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1232 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1242 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1242 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1248 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1248 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1254 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1254 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1260 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1260 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1262 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1262 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | PCB-1268 (mg/kg)                           |              |                |               |                |                |               |
|                                  | PCB-1268 (mg/kg ww)                        |              |                |               |                |                |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg)    |              |                |               |                |                |               |
|                                  | Total Polychlorinated Biphenyls (mg/kg ww) |              |                |               |                |                |               |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                             |              |                |               |                |                |               |
|                                  | Aldrin (mg/kg ww)                          |              |                |               |                |                |               |
|                                  | alpha-BHC (mg/kg)                          |              |                |               |                |                |               |
|                                  | alpha-BHC (mg/kg ww)                       |              |                |               |                |                |               |
|                                  | beta-BHC (mg/kg)                           |              |                |               |                |                |               |
|                                  | beta-BHC (mg/kg ww)                        |              |                |               |                |                |               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                             | Sample ID    | L677662-41 | L677662-42        | L677662-43  | L677662-44  | L677662-45         |
|--------------------------------------|---------------------------------------------|--------------|------------|-------------------|-------------|-------------|--------------------|
|                                      |                                             | Description  |            |                   |             |             |                    |
|                                      |                                             | Sampled Date | 18-MAR-08  | 18-MAR-08         | 18-MAR-08   | 18-MAR-08   | 16-MAR-08          |
|                                      |                                             | Sampled Time |            |                   |             |             |                    |
|                                      |                                             | Client ID    | BRYCON     | BRYCON            | BRYCON 16CM | BRYCON 14CM | BRYCON             |
| Grouping                             | Analyte                                     |              | 17.6CM MF1 | 16.3CM TL<br>BFH1 | TL MF1      | TL MF1      | 13.2CM TL<br>H4/W4 |
| <b>TISSUE</b>                        |                                             |              |            |                   |             |             |                    |
| <b>Metals</b>                        | Strontium (Sr)-Total (mg/kg)                |              | 132        | 114               | 123         | 111         | 117                |
|                                      | Strontium (Sr)-Total (mg/kg wwt)            |              | 28.6       | 29.5              | 29.8        | 29.5        | 25.3               |
|                                      | Thallium (Tl)-Total (mg/kg)                 |              | <0.030     | <0.030            | <0.030      | <0.030      | <0.030             |
|                                      | Thallium (Tl)-Total (mg/kg wwt)             |              | <0.010     | <0.010            | <0.010      | <0.010      | <0.010             |
|                                      | Tin (Sn)-Total (mg/kg)                      |              | <0.20      | <0.20             | <0.20       | <0.20       | <0.20              |
|                                      | Tin (Sn)-Total (mg/kg wwt)                  |              | <0.050     | <0.050            | <0.050      | <0.050      | <0.050             |
|                                      | Uranium (U)-Total (mg/kg)                   |              | <0.010     | <0.010            | <0.010      | <0.010      | <0.010             |
|                                      | Uranium (U)-Total (mg/kg wwt)               |              | <0.0020    | <0.0020           | <0.0020     | <0.0020     | <0.0020            |
|                                      | Vanadium (V)-Total (mg/kg)                  |              | 2.94       | <0.50             | 0.69        | 0.86        | 2.59               |
|                                      | Vanadium (V)-Total (mg/kg wwt)              |              | 0.64       | <0.10             | 0.17        | 0.23        | 0.56               |
|                                      | Zinc (Zn)-Total (mg/kg)                     |              | 97.7       | 71.5              | 90.3        | 105         | 156                |
|                                      | Zinc (Zn)-Total (mg/kg wwt)                 |              | 21.2       | 18.4              | 21.9        | 27.9        | 33.8               |
| <b>Polychlorinated<br/>Biphenyls</b> | PCB-1016 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1016 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1221 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1221 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1232 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1232 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1242 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1242 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1248 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1248 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1254 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1254 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1260 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1260 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1262 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1262 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | PCB-1268 (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | PCB-1268 (mg/kg wwt)                        |              |            |                   |             |             |                    |
|                                      | Total Polychlorinated Biphenyls (mg/kg)     |              |            |                   |             |             |                    |
|                                      | Total Polychlorinated Biphenyls (mg/kg wwt) |              |            |                   |             |             |                    |
| <b>Organochlorine<br/>Pesticides</b> | Aldrin (mg/kg)                              |              |            |                   |             |             |                    |
|                                      | Aldrin (mg/kg wwt)                          |              |            |                   |             |             |                    |
|                                      | alpha-BHC (mg/kg)                           |              |            |                   |             |             |                    |
|                                      | alpha-BHC (mg/kg wwt)                       |              |            |                   |             |             |                    |
|                                      | beta-BHC (mg/kg)                            |              |            |                   |             |             |                    |
|                                      | beta-BHC (mg/kg wwt)                        |              |            |                   |             |             |                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                                            | Sample ID    | L677662-46            | L677662-47              | L677662-48                          | L677662-49                       | L677662-50                        |
|------------------------------|--------------------------------------------|--------------|-----------------------|-------------------------|-------------------------------------|----------------------------------|-----------------------------------|
|                              |                                            | Description  |                       |                         |                                     |                                  |                                   |
|                              |                                            | Sampled Date | 18-MAR-08             | 13-MAR-08               | 10-MAR-08                           | 11-MAR-08                        | 10-MAR-08                         |
|                              |                                            | Sampled Time |                       |                         |                                     |                                  |                                   |
|                              |                                            | Client ID    | BRYCON 16cm<br>TL MF1 | BRYCON<br>17.2CM TL RF1 | CARANX<br>LOTUS 32.1CM<br>RL 620.0G | CARANX<br>LATUS 21.6CM<br>FL CF1 | CARANX<br>CRISUS 27.5CM<br>349.0G |
| Grouping                     | Analyte                                    |              |                       |                         |                                     |                                  |                                   |
| TISSUE                       |                                            |              |                       |                         | "CAIMITO"                           | "CAIMITO"                        | "CAIMITO"                         |
| Metals                       | Strontium (Sr)-Total (mg/kg)               | 95.0         | 72.3                  | 258                     | 96.7                                | 226                              |                                   |
|                              | Strontium (Sr)-Total (mg/kg ww)            | 20.2         | 21.0                  | 72.4                    | 24.9                                | 60.0                             |                                   |
|                              | Thallium (Tl)-Total (mg/kg)                | <0.030       | <0.030                | <0.060                  | <0.030                              | <0.060                           |                                   |
|                              | Thallium (Tl)-Total (mg/kg ww)             | <0.010       | <0.010                | <0.020                  | <0.010                              | <0.020                           |                                   |
|                              | Tin (Sn)-Total (mg/kg)                     | <0.20        | <0.20                 | <0.40                   | 0.24                                | <0.40                            |                                   |
|                              | Tin (Sn)-Total (mg/kg ww)                  | <0.050       | <0.050                | <0.10                   | 0.062                               | <0.10                            |                                   |
|                              | Uranium (U)-Total (mg/kg)                  | <0.010       | <0.010                | <0.020                  | <0.010                              | 0.027                            |                                   |
|                              | Uranium (U)-Total (mg/kg ww)               | <0.0020      | <0.0020               | 0.0042                  | <0.0020                             | 0.0072                           |                                   |
|                              | Vanadium (V)-Total (mg/kg)                 | 1.35         | <0.50                 | <1.0                    | <0.50                               | <1.0                             |                                   |
|                              | Vanadium (V)-Total (mg/kg ww)              | 0.29         | <0.10                 | <0.20                   | <0.10                               | <0.20                            |                                   |
|                              | Zinc (Zn)-Total (mg/kg)                    | 79.4         | 64.9                  | 47.1                    | 41.1                                | 77.2                             |                                   |
|                              | Zinc (Zn)-Total (mg/kg ww)                 | 16.9         | 18.8                  | 13.2                    | 10.6                                | 20.4                             |                                   |
| Polychlorinated<br>Biphenyls | PCB-1016 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1016 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1221 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1221 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1232 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1232 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1242 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1242 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1248 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1248 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1254 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1254 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1260 (mg/kg)                           |              | <0.25                 | 0.28                    |                                     |                                  |                                   |
|                              | PCB-1260 (mg/kg ww)                        |              | <0.050                | 0.078                   |                                     |                                  |                                   |
|                              | PCB-1262 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1262 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | PCB-1268 (mg/kg)                           |              | <0.25                 | <0.25                   |                                     |                                  |                                   |
|                              | PCB-1268 (mg/kg ww)                        |              | <0.050                | <0.050                  |                                     |                                  |                                   |
|                              | Total Polychlorinated Biphenyls (mg/kg)    |              | <0.25                 | 0.28                    |                                     |                                  |                                   |
|                              | Total Polychlorinated Biphenyls (mg/kg ww) |              | <0.050                | 0.078                   |                                     |                                  |                                   |
| Organochlorine<br>Pesticides | Aldrin (mg/kg)                             |              | <1.0                  | <1.0                    |                                     |                                  |                                   |
|                              | Aldrin (mg/kg ww)                          |              | <0.20                 | <0.20                   |                                     |                                  |                                   |
|                              | alpha-BHC (mg/kg)                          |              | <1.0                  | <1.0                    |                                     |                                  |                                   |
|                              | alpha-BHC (mg/kg ww)                       |              | <0.20                 | <0.20                   |                                     |                                  |                                   |
|                              | beta-BHC (mg/kg)                           |              | <1.0                  | <1.0                    |                                     |                                  |                                   |
|                              | beta-BHC (mg/kg ww)                        |              | <0.20                 | <0.20                   |                                     |                                  |                                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-51<br><br>10-MAR-08<br><br>CARANX<br>CRISUS 30.0CM<br>449.3G<br>"CAIMITO" |  |  |  |  |
|----------------------------------|---------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------|--|--|--|--|
| Grouping                         | Analyte                                     |                                                                       |                                                                                   |  |  |  |  |
| <b>TISSUE</b>                    |                                             |                                                                       |                                                                                   |  |  |  |  |
| <b>Metals</b>                    | Strontium (Sr)-Total (mg/kg)                | 124                                                                   |                                                                                   |  |  |  |  |
|                                  | Strontium (Sr)-Total (mg/kg wwt)            | 34.6                                                                  |                                                                                   |  |  |  |  |
|                                  | Thallium (Tl)-Total (mg/kg)                 | <0.030                                                                |                                                                                   |  |  |  |  |
|                                  | Thallium (Tl)-Total (mg/kg wwt)             | <0.010                                                                |                                                                                   |  |  |  |  |
|                                  | Tin (Sn)-Total (mg/kg)                      | <0.20                                                                 |                                                                                   |  |  |  |  |
|                                  | Tin (Sn)-Total (mg/kg wwt)                  | <0.050                                                                |                                                                                   |  |  |  |  |
|                                  | Uranium (U)-Total (mg/kg)                   | 0.016                                                                 |                                                                                   |  |  |  |  |
|                                  | Uranium (U)-Total (mg/kg wwt)               | 0.0045                                                                |                                                                                   |  |  |  |  |
|                                  | Vanadium (V)-Total (mg/kg)                  | <0.50                                                                 |                                                                                   |  |  |  |  |
|                                  | Vanadium (V)-Total (mg/kg wwt)              | <0.10                                                                 |                                                                                   |  |  |  |  |
|                                  | Zinc (Zn)-Total (mg/kg)                     | 59.0                                                                  |                                                                                   |  |  |  |  |
|                                  | Zinc (Zn)-Total (mg/kg wwt)                 | 16.5                                                                  |                                                                                   |  |  |  |  |
| <b>Polychlorinated Biphenyls</b> | PCB-1016 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1016 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1221 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1221 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1232 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1232 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1242 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1242 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1248 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1248 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1254 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1254 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1260 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1260 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1262 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1262 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1268 (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | PCB-1268 (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |
|                                  | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       |                                                                                   |  |  |  |  |
|                                  | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       |                                                                                   |  |  |  |  |
| <b>Organochlorine Pesticides</b> | Aldrin (mg/kg)                              |                                                                       |                                                                                   |  |  |  |  |
|                                  | Aldrin (mg/kg wwt)                          |                                                                       |                                                                                   |  |  |  |  |
|                                  | alpha-BHC (mg/kg)                           |                                                                       |                                                                                   |  |  |  |  |
|                                  | alpha-BHC (mg/kg wwt)                       |                                                                       |                                                                                   |  |  |  |  |
|                                  | beta-BHC (mg/kg)                            |                                                                       |                                                                                   |  |  |  |  |
|                                  | beta-BHC (mg/kg wwt)                        |                                                                       |                                                                                   |  |  |  |  |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-1<br><br>17-MAR-08<br><br>GUABINA 20CM<br>TL W7 | L677662-2<br><br>17-MAR-08<br><br>GUABINA<br>22.4CM TL W7 | L677662-3<br><br>16-MAR-08<br><br>GUABINA<br>16.1cm TL SJF1 | L677662-4<br><br>11-MAR-08<br><br>CAIMITO 20CM<br>TL "GUABINA" | L677662-5<br><br>11-MAR-08<br><br>G. DORMITOR<br>14.4CM TL CF1 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                         |                                                           |                                                             |                                                                |                                                                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-6<br><br>13-MAR-08<br><br>GUABINA 15CM<br>TL HF1 "HOJA" | L677662-7<br><br>19-MAR-08<br><br>GUABINA<br>15.4CM TL PF1<br>"PATAQUILLA" | L677662-8<br><br>14-MAR-08<br><br>GUABINA<br>25.1CM TL PF1 | L677662-9<br><br>16-MAR-08<br><br>GUABINA<br>21.8CM TL<br>H4/W4 | L677662-10<br><br>16-MAR-08<br><br>GUABINA<br>20.4CM TL<br>H4/W4 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                                 |                                                                            |                                                            |                                                                 |                                                                  |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                                 |                                                                            |                                                            |                                                                 |                                                                  |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                                 |                                                                            |                                                            | <1.0                                                            |                                                                  |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                                 |                                                                            |                                                            | <0.20                                                           |                                                                  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-11                         | L677662-12                    | L677662-13                            | L677662-14                                    | L677662-15                               |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|------------------------------------|-------------------------------|---------------------------------------|-----------------------------------------------|------------------------------------------|
| Grouping                             | Analyte                             |                                                                       | CAIMITO<br>13.5CM CF2<br>"GUABINA" | G. DORIMITOR<br>10.2CM TL CF1 | CAIMITO<br>20.2CM TL CF2<br>"GUABINA" | G. DORIMITOR<br>15.7CM TL RF1<br>"RINCONCITO" | GUABINA<br>20.6CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>                        |                                     |                                                                       |                                    |                               |                                       |                                               |                                          |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endrin (mg/kg)                      |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Mirex (mg/kg)                       |                                                                       |                                    |                               |                                       |                                               |                                          |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                    |                               |                                       |                                               |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-16<br><br>16-MAR-08<br><br>GUABINA<br>22.8CM SJF1 | L677662-17<br><br>14-MAR-08<br><br>GUABINA<br>16.4CM TL PF1<br>"PETAQUILLA" | L677662-18<br><br>14-MAR-08<br><br>GUABINA<br>17.6CM TL PF1 | L677662-19<br><br>17-MAR-08<br><br>GUABINA<br>19.1CM TL W7 | L677662-20<br><br>14-MAR-08<br><br>GUABINA<br>23.4CM TL PF1<br>"PETAQUILLA" |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                           |                                                                             |                                                             |                                                            |                                                                             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-21                         | L677662-22                             | L677662-23                   | L677662-24                          | L677662-25                            |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|------------------------------------|----------------------------------------|------------------------------|-------------------------------------|---------------------------------------|
| Grouping                             | Analyte                             |                                                                       | GUABINA<br>19.7CM PF1<br>"GUABINA" | GUABINA 19.3<br>TL RF1<br>"RINCONCITO" | GUABINA<br>23.0CM TL<br>BFH1 | GUABINA 16.1<br>TL HF1<br>"GUABINA" | GUABINA<br>10.6CM TL CF1<br>"CAIMITO" |
| <b>TISSUE</b>                        |                                     |                                                                       |                                    |                                        |                              |                                     |                                       |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endrin (mg/kg)                      |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Mirex (mg/kg)                       |                                                                       |                                    |                                        |                              |                                     |                                       |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                    |                                        |                              |                                     |                                       |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-26<br><br>13-MAR-08<br><br>GUABINA HFI<br>"HOJA" | L677662-27<br><br>16-MAR-08<br><br>BOCA CHICA<br>14.6CM TL SJF1 | L677662-28<br><br>11-MAR-08<br><br>BOCA CHICA<br>18CM FL CF1 | L677662-29<br><br>13-MAR-08<br><br>BOCA CHICA<br>19.9CM TL HF1<br>"HOJA" | L677662-30<br><br>18-MAR-08<br><br>LORICARDAL<br>9.9CM TL BFH1 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                          |                                                                 |                                                              |                                                                          |                                                                |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                          |                                                                 |                                                              |                                                                          |                                                                |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                          |                                                                 |                                                              | <1.0                                                                     |                                                                |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                          |                                                                 |                                                              | <0.20                                                                    |                                                                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-31<br><br>18-MAR-08<br><br>LORICARDAL<br>13CM TL BFH1 | L677662-32<br><br>16-MAR-08<br><br>BRYCON<br>14.3CM TL SJF1 | L677662-33<br><br>18-MAR-08<br><br>BRYCON<br>13.4CM TL<br>BFH1 | L677662-34<br><br>13-MAR-08<br><br>BRYCON<br>14.8CM TL RF1<br>"RICONCITO" | L677662-35<br><br>18-MAR-08<br><br>BRYCON<br>11.7CM TL MF1 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                               |                                                             |                                                                |                                                                           |                                                            |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-36<br><br>16-MAR-08<br><br>BRYCON<br>13.3CM TL SJF1 | L677662-37<br><br>18-MAR-08<br><br>BRYCON<br>15.5CM TL MF1 | L677662-38<br><br>18-MAR-08<br><br>BRYCON<br>14.8CM TL<br>BFH1 | L677662-39<br><br>18-MAR-08<br><br>BRYCON<br>13.7CM TL<br>BFH1 | L677662-40<br><br>18-MAR-08<br><br>BRYCON<br>16.3CM TL MF1 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                             |                                                            |                                                                |                                                                |                                                            |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-41           | L677662-42                  | L677662-43            | L677662-44            | L677662-45                   |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|----------------------|-----------------------------|-----------------------|-----------------------|------------------------------|
| Grouping                             | Analyte                             |                                                                       | BRYCON<br>17.6CM MF1 | BRYCON<br>16.3CM TL<br>BFH1 | BRYCON 16CM<br>TL MF1 | BRYCON 14CM<br>TL MF1 | BRYCON<br>13.2CM TL<br>H4/W4 |
| <b>TISSUE</b>                        |                                     |                                                                       |                      |                             |                       |                       |                              |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                      |                             |                       |                       |                              |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                      |                             |                       |                       |                              |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                      |                             |                       |                       |                              |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                      |                             |                       |                       |                              |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                      |                             |                       |                       |                              |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                      |                             |                       |                       |                              |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                      |                             |                       |                       |                              |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                      |                             |                       |                       |                              |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endrin (mg/kg)                      |                                                                       |                      |                             |                       |                       |                              |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                      |                             |                       |                       |                              |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                      |                             |                       |                       |                              |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                      |                             |                       |                       |                              |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                      |                             |                       |                       |                              |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                      |                             |                       |                       |                              |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                      |                             |                       |                       |                              |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                      |                             |                       |                       |                              |
|                                      | Mirex (mg/kg)                       |                                                                       |                      |                             |                       |                       |                              |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                      |                             |                       |                       |                              |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L677662-46            | L677662-47              | L677662-48                          | L677662-49                       | L677662-50                        |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------------------|-------------------------|-------------------------------------|----------------------------------|-----------------------------------|
| Grouping                             | Analyte                             |                                                                       | BRYCON 16cm<br>TL MF1 | BRYCON<br>17.2CM TL RF1 | CARANX<br>LOTUS 32.1CM<br>RL 620.0G | CARANX<br>LATUS 21.6CM<br>FL CF1 | CARANX<br>CRISUS 27.5CM<br>349.0G |
| <b>TISSUE</b>                        |                                     |                                                                       |                       |                         | "CAIMITO"                           | "CAIMITO"                        | "CAIMITO"                         |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Endrin (mg/kg)                      |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |
|                                      | Mirex (mg/kg)                       |                                                                       |                       | <1.0                    | <1.0                                |                                  |                                   |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                       | <0.20                   | <0.20                               |                                  |                                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                                     |              |               |  |  |  |  |
|------------------------------|-------------------------------------|--------------|---------------|--|--|--|--|
|                              |                                     | Sample ID    | L677662-51    |  |  |  |  |
|                              |                                     | Description  |               |  |  |  |  |
|                              |                                     | Sampled Date | 10-MAR-08     |  |  |  |  |
|                              |                                     | Sampled Time |               |  |  |  |  |
|                              |                                     | Client ID    | CARANX        |  |  |  |  |
| Grouping                     | Analyte                             |              | CRISUS 30.0CM |  |  |  |  |
|                              |                                     |              | 449.3G        |  |  |  |  |
| TISSUE                       |                                     |              | "CAIMITO"     |  |  |  |  |
| Organochlorine<br>Pesticides | Lindane (gamma - BHC) (mg/kg)       |              |               |  |  |  |  |
|                              | Lindane (gamma - BHC) (mg/kg wwt)   |              |               |  |  |  |  |
|                              | delta-BHC (mg/kg)                   |              |               |  |  |  |  |
|                              | delta-BHC (mg/kg wwt)               |              |               |  |  |  |  |
|                              | cis-Chlordane (alpha) (mg/kg)       |              |               |  |  |  |  |
|                              | cis-Chlordane (alpha) (mg/kg wwt)   |              |               |  |  |  |  |
|                              | trans-Chlordane (gamma) (mg/kg)     |              |               |  |  |  |  |
|                              | trans-Chlordane (gamma) (mg/kg wwt) |              |               |  |  |  |  |
|                              | 2,4'-DDD (mg/kg)                    |              |               |  |  |  |  |
|                              | 2,4'-DDD (mg/kg wwt)                |              |               |  |  |  |  |
|                              | 4,4'-DDD (mg/kg)                    |              |               |  |  |  |  |
|                              | 4,4'-DDD (mg/kg wwt)                |              |               |  |  |  |  |
|                              | 2,4'-DDE (mg/kg)                    |              |               |  |  |  |  |
|                              | 2,4'-DDE (mg/kg wwt)                |              |               |  |  |  |  |
|                              | 4,4'-DDE (mg/kg)                    |              |               |  |  |  |  |
|                              | 4,4'-DDE (mg/kg wwt)                |              |               |  |  |  |  |
|                              | 2,4'-DDT (mg/kg)                    |              |               |  |  |  |  |
|                              | 2,4'-DDT (mg/kg wwt)                |              |               |  |  |  |  |
|                              | 4,4'-DDT (mg/kg)                    |              |               |  |  |  |  |
|                              | 4,4'-DDT (mg/kg wwt)                |              |               |  |  |  |  |
|                              | Dieldrin (mg/kg)                    |              |               |  |  |  |  |
|                              | Dieldrin (mg/kg wwt)                |              |               |  |  |  |  |
|                              | Endosulfan I (mg/kg)                |              |               |  |  |  |  |
|                              | Endosulfan I (mg/kg wwt)            |              |               |  |  |  |  |
|                              | Endosulfan II (mg/kg)               |              |               |  |  |  |  |
|                              | Endosulfan II (mg/kg wwt)           |              |               |  |  |  |  |
|                              | Endosulfan Sulfate (mg/kg)          |              |               |  |  |  |  |
|                              | Endosulfan Sulfate (mg/kg wwt)      |              |               |  |  |  |  |
|                              | Endrin (mg/kg)                      |              |               |  |  |  |  |
|                              | Endrin (mg/kg wwt)                  |              |               |  |  |  |  |
|                              | Heptachlor (mg/kg)                  |              |               |  |  |  |  |
|                              | Heptachlor (mg/kg wwt)              |              |               |  |  |  |  |
|                              | Heptachlor Epoxide (mg/kg)          |              |               |  |  |  |  |
|                              | Heptachlor Epoxide (mg/kg wwt)      |              |               |  |  |  |  |
|                              | Methoxychlor (mg/kg)                |              |               |  |  |  |  |
|                              | Methoxychlor (mg/kg wwt)            |              |               |  |  |  |  |
|                              | Mirex (mg/kg)                       |              |               |  |  |  |  |
|                              | Mirex (mg/kg wwt)                   |              |               |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L677662-1             | L677662-2               | L677662-3                 | L677662-4                    | L677662-5                    |
|------------------------------|-----------------------------|--------------|-----------------------|-------------------------|---------------------------|------------------------------|------------------------------|
|                              |                             | Description  |                       |                         |                           |                              |                              |
|                              |                             | Sampled Date | 17-MAR-08             | 17-MAR-08               | 16-MAR-08                 | 11-MAR-08                    | 11-MAR-08                    |
|                              |                             | Sampled Time |                       |                         |                           |                              |                              |
|                              |                             | Client ID    | GUABINA 20CM<br>TL W7 | GUABINA<br>22.4CM TL W7 | GUABINA<br>16.1cm TL SJF1 | CAIMITO 20CM<br>TL "GUABINA" | G. DORMITOR<br>14.4CM TL CF1 |
| Grouping                     | Analyte                     |              |                       |                         |                           |                              |                              |
| TISSUE                       |                             |              |                       |                         |                           |                              |                              |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |                       |                         |                           |                              |                              |
|                              | cis-Nonachlor (mg/kg wwt)   |              |                       |                         |                           |                              |                              |
|                              | trans-Nonachlor (mg/kg)     |              |                       |                         |                           |                              |                              |
|                              | trans-Nonachlor (mg/kg wwt) |              |                       |                         |                           |                              |                              |
|                              | Oxychlorthane (mg/kg)       |              |                       |                         |                           |                              |                              |
|                              | Oxychlorthane (mg/kg wwt)   |              |                       |                         |                           |                              |                              |

|                              |                             |              |                               |                                          |                          |                               |                               |
|------------------------------|-----------------------------|--------------|-------------------------------|------------------------------------------|--------------------------|-------------------------------|-------------------------------|
|                              |                             | Sample ID    | L677662-6                     | L677662-7                                | L677662-8                | L677662-9                     | L677662-10                    |
|                              |                             | Description  |                               |                                          |                          |                               |                               |
|                              |                             | Sampled Date | 13-MAR-08                     | 19-MAR-08                                | 14-MAR-08                | 16-MAR-08                     | 16-MAR-08                     |
|                              |                             | Sampled Time |                               |                                          |                          |                               |                               |
|                              |                             | Client ID    | GUABINA 15CM<br>TL HF1 "HOJA" | GUABINA<br>15.4CM TL PF1<br>"PATAQUILLA" | GUABINA<br>25.1CM TL PF1 | GUABINA<br>21.8CM TL<br>H4/W4 | GUABINA<br>20.4CM TL<br>H4/W4 |
| Grouping                     | Analyte                     |              |                               |                                          |                          |                               |                               |
| TISSUE                       |                             |              |                               |                                          |                          |                               |                               |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |                               |                                          |                          | <1.0                          |                               |
|                              | cis-Nonachlor (mg/kg wwt)   |              |                               |                                          |                          | <0.20                         |                               |
|                              | trans-Nonachlor (mg/kg)     |              |                               |                                          |                          | <1.0                          |                               |
|                              | trans-Nonachlor (mg/kg wwt) |              |                               |                                          |                          | <0.20                         |                               |
|                              | Oxychlordane (mg/kg)        |              |                               |                                          |                          | <1.0                          |                               |
|                              | Oxychlordane (mg/kg wwt)    |              |                               |                                          |                          | <0.20                         |                               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L677662-11    | L677662-12    | L677662-13    | L677662-14    | L677662-15   |
|------------------------------|-----------------------------|--------------|---------------|---------------|---------------|---------------|--------------|
|                              |                             | Description  |               |               |               |               |              |
|                              |                             | Sampled Date | 11-MAR-08     | 11-MAR-08     | 11-MAR-08     | 13-MAR-08     | 14-MAR-08    |
|                              |                             | Sampled Time |               |               |               |               |              |
|                              |                             | Client ID    | CAIMITO       | G. DORIMITOR  | CAIMITO       | G. DORIMITOR  | GUABINA      |
| Grouping                     | Analyte                     | 13.5CM CF2   | 10.2CM TL CF1 | 20.2CM TL CF2 | 15.7CM TL RF1 | 20.6CM TL PF1 | "PETAQUILLA" |
| TISSUE                       |                             | "GUABINA"    |               |               | "GUABINA"     | "RINCONCITO"  |              |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |               |               |               |               |              |
|                              | cis-Nonachlor (mg/kg wwt)   |              |               |               |               |               |              |
|                              | trans-Nonachlor (mg/kg)     |              |               |               |               |               |              |
|                              | trans-Nonachlor (mg/kg wwt) |              |               |               |               |               |              |
|                              | Oxychlordan (mg/kg)         |              |               |               |               |               |              |
|                              | Oxychlordan (mg/kg wwt)     |              |               |               |               |               |              |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                             | Sample ID    | L677662-16  | L677662-17                    | L677662-18    | L677662-19   | L677662-20                    |
|--------------------------------------|-----------------------------|--------------|-------------|-------------------------------|---------------|--------------|-------------------------------|
|                                      |                             | Description  |             |                               |               |              |                               |
|                                      |                             | Sampled Date | 16-MAR-08   | 14-MAR-08                     | 14-MAR-08     | 17-MAR-08    | 14-MAR-08                     |
|                                      |                             | Sampled Time |             |                               |               |              |                               |
|                                      |                             | Client ID    | GUABINA     | GUABINA                       | GUABINA       | GUABINA      | GUABINA                       |
| Grouping                             | Analyte                     |              | 22.8CM SJF1 | 16.4CM TL PF1<br>"PETAQUILLA" | 17.6CM TL PF1 | 19.1CM TL W7 | 23.4CM TL PF1<br>"PETAQUILLA" |
| <b>TISSUE</b>                        |                             |              |             |                               |               |              |                               |
| <b>Organochlorine<br/>Pesticides</b> | cis-Nonachlor (mg/kg)       |              |             |                               |               |              |                               |
|                                      | cis-Nonachlor (mg/kg wwt)   |              |             |                               |               |              |                               |
|                                      | trans-Nonachlor (mg/kg)     |              |             |                               |               |              |                               |
|                                      | trans-Nonachlor (mg/kg wwt) |              |             |                               |               |              |                               |
|                                      | Oxychlordane (mg/kg)        |              |             |                               |               |              |                               |
|                                      | Oxychlordane (mg/kg wwt)    |              |             |                               |               |              |                               |

ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L677662-21   | L677662-22   | L677662-23 | L677662-24    | L677662-25 |
|------------------------------|-----------------------------|--------------|--------------|--------------|------------|---------------|------------|
|                              |                             | Description  |              |              |            |               |            |
|                              |                             | Sampled Date | 14-MAR-08    | 13-MAR-08    | 18-MAR-08  | 13-MAR-08     | 11-MAR-08  |
|                              |                             | Sampled Time |              |              |            |               |            |
|                              |                             | Client ID    | GUABINA      | GUABINA 19.3 | GUABINA    | GUABINA 16.1  | GUABINA    |
| Grouping                     | Analyte                     | 19.7CM PF1   | TL RF1       | 23.0CM TL    | TL HF1     | 10.6CM TL CF1 |            |
|                              |                             | "GUABINA"    | "RINCONCITO" | BFH1         | "GUABINA"  | "CAIMITO"     |            |
| TISSUE                       |                             |              |              |              |            |               |            |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |              |              |            |               |            |
|                              | cis-Nonachlor (mg/kg wwt)   |              |              |              |            |               |            |
|                              | trans-Nonachlor (mg/kg)     |              |              |              |            |               |            |
|                              | trans-Nonachlor (mg/kg wwt) |              |              |              |            |               |            |
|                              | Oxychlordan (mg/kg)         |              |              |              |            |               |            |
|                              | Oxychlordan (mg/kg wwt)     |              |              |              |            |               |            |





# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                             | Sample ID    | L677662-31   | L677662-32     | L677662-33     | L677662-34                   | L677662-35    |
|--------------------------------------|-----------------------------|--------------|--------------|----------------|----------------|------------------------------|---------------|
|                                      |                             | Description  |              |                |                |                              |               |
|                                      |                             | Sampled Date | 18-MAR-08    | 16-MAR-08      | 18-MAR-08      | 13-MAR-08                    | 18-MAR-08     |
|                                      |                             | Sampled Time |              |                |                |                              |               |
|                                      |                             | Client ID    | LORICARDAL   | BRYCON         | BRYCON         | BRYCON                       | BRYCON        |
| Grouping                             | Analyte                     |              | 13CM TL BFH1 | 14.3CM TL SJF1 | 13.4CM TL BFH1 | 14.8CM TL RF1<br>"RICONCITO" | 11.7CM TL MF1 |
| <b>TISSUE</b>                        |                             |              |              |                |                |                              |               |
| <b>Organochlorine<br/>Pesticides</b> | cis-Nonachlor (mg/kg)       |              |              |                |                |                              |               |
|                                      | cis-Nonachlor (mg/kg wwt)   |              |              |                |                |                              |               |
|                                      | trans-Nonachlor (mg/kg)     |              |              |                |                |                              |               |
|                                      | trans-Nonachlor (mg/kg wwt) |              |              |                |                |                              |               |
|                                      | Oxychlordan (mg/kg)         |              |              |                |                |                              |               |
|                                      | Oxychlordan (mg/kg wwt)     |              |              |                |                |                              |               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                             | Sample ID    | L677662-36     | L677662-37    | L677662-38     | L677662-39     | L677662-40    |
|----------------------------------|-----------------------------|--------------|----------------|---------------|----------------|----------------|---------------|
|                                  |                             | Description  |                |               |                |                |               |
|                                  |                             | Sampled Date | 16-MAR-08      | 18-MAR-08     | 18-MAR-08      | 18-MAR-08      | 18-MAR-08     |
|                                  |                             | Sampled Time |                |               |                |                |               |
|                                  |                             | Client ID    | BRYCON         | BRYCON        | BRYCON         | BRYCON         | BRYCON        |
| Grouping                         | Analyte                     |              | 13.3CM TL SJF1 | 15.5CM TL MF1 | 14.8CM TL BFH1 | 13.7CM TL BFH1 | 16.3CM TL MF1 |
| <b>TISSUE</b>                    |                             |              |                |               |                |                |               |
| <b>Organochlorine Pesticides</b> | cis-Nonachlor (mg/kg)       |              |                |               |                |                |               |
|                                  | cis-Nonachlor (mg/kg wwt)   |              |                |               |                |                |               |
|                                  | trans-Nonachlor (mg/kg)     |              |                |               |                |                |               |
|                                  | trans-Nonachlor (mg/kg wwt) |              |                |               |                |                |               |
|                                  | Oxychlordan (mg/kg)         |              |                |               |                |                |               |
|                                  | Oxychlordan (mg/kg wwt)     |              |                |               |                |                |               |

ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L677662-41 | L677662-42        | L677662-43  | L677662-44  | L677662-45         |
|------------------------------|-----------------------------|--------------|------------|-------------------|-------------|-------------|--------------------|
|                              |                             | Description  |            |                   |             |             |                    |
|                              |                             | Sampled Date | 18-MAR-08  | 18-MAR-08         | 18-MAR-08   | 18-MAR-08   | 16-MAR-08          |
|                              |                             | Sampled Time |            |                   |             |             |                    |
|                              |                             | Client ID    | BRYCON     | BRYCON            | BRYCON 16CM | BRYCON 14CM | BRYCON             |
| Grouping                     | Analyte                     |              | 17.6CM MF1 | 16.3CM TL<br>BFH1 | TL MF1      | TL MF1      | 13.2CM TL<br>H4/W4 |
| TISSUE                       |                             |              |            |                   |             |             |                    |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |            |                   |             |             |                    |
|                              | cis-Nonachlor (mg/kg wwt)   |              |            |                   |             |             |                    |
|                              | trans-Nonachlor (mg/kg)     |              |            |                   |             |             |                    |
|                              | trans-Nonachlor (mg/kg wwt) |              |            |                   |             |             |                    |
|                              | Oxychlordane (mg/kg)        |              |            |                   |             |             |                    |
|                              | Oxychlordane (mg/kg wwt)    |              |            |                   |             |             |                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L677662-46            | L677662-47              | L677662-48                          | L677662-49                       | L677662-50                        |
|------------------------------|-----------------------------|--------------|-----------------------|-------------------------|-------------------------------------|----------------------------------|-----------------------------------|
|                              |                             | Description  |                       |                         |                                     |                                  |                                   |
|                              |                             | Sampled Date | 18-MAR-08             | 13-MAR-08               | 10-MAR-08                           | 11-MAR-08                        | 10-MAR-08                         |
|                              |                             | Sampled Time |                       |                         |                                     |                                  |                                   |
|                              |                             | Client ID    | BRYCON 16cm<br>TL MF1 | BRYCON<br>17.2CM TL RF1 | CARANX<br>LOTUS 32.1CM<br>RL 620.0G | CARANX<br>LATUS 21.6CM<br>FL CF1 | CARANX<br>CRISUS 27.5CM<br>349.0G |
| Grouping                     | Analyte                     |              |                       |                         |                                     |                                  |                                   |
| TISSUE                       |                             |              |                       |                         | "CAIMITO"                           | "CAIMITO"                        | "CAIMITO"                         |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |                       | <1.0                    | <1.0                                |                                  |                                   |
|                              | cis-Nonachlor (mg/kg wwt)   |              |                       | <0.20                   | <0.20                               |                                  |                                   |
|                              | trans-Nonachlor (mg/kg)     |              |                       | <1.0                    | <1.0                                |                                  |                                   |
|                              | trans-Nonachlor (mg/kg wwt) |              |                       | <0.20                   | <0.20                               |                                  |                                   |
|                              | Oxychlordan (mg/kg)         |              |                       | <1.0                    | <1.0                                |                                  |                                   |
|                              | Oxychlordan (mg/kg wwt)     |              |                       | <0.20                   | <0.20                               |                                  |                                   |

ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             |              |               |  |  |  |  |
|------------------------------|-----------------------------|--------------|---------------|--|--|--|--|
|                              |                             | Sample ID    | L677662-51    |  |  |  |  |
|                              |                             | Description  |               |  |  |  |  |
|                              |                             | Sampled Date | 10-MAR-08     |  |  |  |  |
|                              |                             | Sampled Time |               |  |  |  |  |
|                              |                             | Client ID    | CARANX        |  |  |  |  |
| Grouping                     | Analyte                     |              | CRISUS 30.0CM |  |  |  |  |
|                              |                             |              | 449.3G        |  |  |  |  |
| TISSUE                       |                             |              | "CAIMITO"     |  |  |  |  |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg)       |              |               |  |  |  |  |
|                              | cis-Nonachlor (mg/kg wwt)   |              |               |  |  |  |  |
|                              | trans-Nonachlor (mg/kg)     |              |               |  |  |  |  |
|                              | trans-Nonachlor (mg/kg wwt) |              |               |  |  |  |  |
|                              | Oxychlordane (mg/kg)        |              |               |  |  |  |  |
|                              | Oxychlordane (mg/kg wwt)    |              |               |  |  |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-DRY-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MET-WET-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MOISTURE-TISS-VA** Tissue % Moisture in Tissues ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

**OCP1-TDRY-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**OCP1-TWET-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**PCB-T-DRY-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**PCB-T-WET-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

|                        |        |                             |                       |
|------------------------|--------|-----------------------------|-----------------------|
| <b>SE-DRY-HVAAS-VA</b> | Tissue | Selenium in Tissue by HVAAS | PUGET SOUND PROTOCOLS |
|------------------------|--------|-----------------------------|-----------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

|                        |        |                             |                       |
|------------------------|--------|-----------------------------|-----------------------|
| <b>SE-WET-HVAAS-VA</b> | Tissue | Selenium in Tissue by HVAAS | PUGET SOUND PROTOCOLS |
|------------------------|--------|-----------------------------|-----------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

**\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

### GLOSSARY OF REPORT TERMS

*Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency.*  
*mg/kg (units) - unit of concentration based on mass, parts per million*  
*mg/L (units) - unit of concentration based on volume, parts per million*  
*N/A - Result not available. Refer to qualifier code and definition for explanation*

*Test results reported relate only to the samples as received by the laboratory.*  
*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*  
*Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.*

*ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.*





Environmental Division

# ALS Laboratory Group Quality Control Report

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Client: GOLDER ASSOCIATES LTD.  
195 PEMBERTON AVE  
NORTH VANCOUVER BC V7P 2R4  
Contact: ADRIAN DE BRUYN

| Test                          | Matrix | Reference           | Result  | Qualifier | Units    | RPD    | Limit  | Analyzed  |
|-------------------------------|--------|---------------------|---------|-----------|----------|--------|--------|-----------|
| <b>HG-DRY-CVAFS-VA Tissue</b> |        |                     |         |           |          |        |        |           |
| <b>Batch R745015</b>          |        |                     |         |           |          |        |        |           |
| <b>WG856600-5 CRM</b>         |        | <b>VA-NIST-2976</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 86      |           | %        |        | 85-117 | 22-OCT-08 |
| <b>WG856600-6 CRM</b>         |        | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 95      |           | %        |        | 85-115 | 22-OCT-08 |
| <b>WG856600-3 DUP</b>         |        | <b>L677662-8</b>    |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.151               | 0.147   |           | mg/kg    | 2.3    | 45     | 22-OCT-08 |
| <b>WG856600-4 DUP</b>         |        | <b>L677662-23</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.237               | 0.232   |           | mg/kg    | 2.3    | 45     | 22-OCT-08 |
| <b>Batch R746010</b>          |        |                     |         |           |          |        |        |           |
| <b>WG858192-6 CRM</b>         |        | <b>VA-NIST-2976</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 86      |           | %        |        | 85-117 | 23-OCT-08 |
| <b>WG858192-7 CRM</b>         |        | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 94      |           | %        |        | 85-115 | 23-OCT-08 |
| <b>WG858192-3 DUP</b>         |        | <b>L677662-34</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.0264              | 0.0294  | J         | mg/kg    | 0.0031 | 0.02   | 23-OCT-08 |
| <b>WG858192-4 DUP</b>         |        | <b>L677662-28</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.0482              | 0.0453  | J         | mg/kg    | 0.0029 | 0.02   | 23-OCT-08 |
| <b>WG858192-5 DUP</b>         |        | <b>L677662-50</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.525               | 0.515   |           | mg/kg    | 1.9    | 45     | 23-OCT-08 |
| <b>Batch R748407</b>          |        |                     |         |           |          |        |        |           |
| <b>WG858192-1 MB</b>          |        |                     |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | <0.0050 |           | mg/kg    |        | 0.005  | 29-OCT-08 |
| <b>WG858192-2 MB</b>          |        |                     |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | <0.0050 |           | mg/kg    |        | 0.005  | 29-OCT-08 |
| <b>HG-WET-CVAFS-VA Tissue</b> |        |                     |         |           |          |        |        |           |
| <b>Batch R745008</b>          |        |                     |         |           |          |        |        |           |
| <b>WG856600-5 CRM</b>         |        | <b>VA-NIST-2976</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 86      |           | %        |        | 85-117 | 22-OCT-08 |
| <b>WG856600-6 CRM</b>         |        | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 95      |           | %        |        | 85-115 | 22-OCT-08 |
| <b>WG856600-3 DUP</b>         |        | <b>L677662-8</b>    |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.0394              | 0.0385  |           | mg/kg ww | 2.3    | 45     | 22-OCT-08 |
| <b>WG856600-4 DUP</b>         |        | <b>L677662-23</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        | 0.0540              | 0.0528  |           | mg/kg ww | 2.3    | 45     | 22-OCT-08 |
| <b>Batch R745999</b>          |        |                     |         |           |          |        |        |           |
| <b>WG858192-6 CRM</b>         |        | <b>VA-NIST-2976</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total            |        |                     | 86      |           | %        |        | 85-117 | 23-OCT-08 |
| <b>WG858192-7 CRM</b>         |        | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |

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| Test                   | Matrix         | Reference           | Result  | Qualifier | Units    | RPD    | Limit  | Analyzed  |
|------------------------|----------------|---------------------|---------|-----------|----------|--------|--------|-----------|
| <b>HG-WET-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |          |        |        |           |
| <b>Batch</b>           | <b>R745999</b> |                     |         |           |          |        |        |           |
| <b>WG858192-7 CRM</b>  |                | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                |                     | 94      |           | %        |        | 85-115 | 23-OCT-08 |
| <b>WG858192-3 DUP</b>  |                | <b>L677662-34</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                | 0.0061              | 0.0068  | J         | mg/kg ww | 0.0007 | 0.004  | 23-OCT-08 |
| <b>WG858192-4 DUP</b>  |                | <b>L677662-28</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                | 0.0121              | 0.0114  |           | mg/kg ww | 6.1    | 45     | 23-OCT-08 |
| <b>WG858192-5 DUP</b>  |                | <b>L677662-50</b>   |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                | 0.139               | 0.136   |           | mg/kg ww | 1.9    | 45     | 23-OCT-08 |
| <b>Batch</b>           | <b>R748407</b> |                     |         |           |          |        |        |           |
| <b>WG858192-1 MB</b>   |                |                     |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg ww |        | 0.001  | 29-OCT-08 |
| <b>WG858192-2 MB</b>   |                |                     |         |           |          |        |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg ww |        | 0.001  | 29-OCT-08 |
| <b>MET-DRY-MS-VA</b>   |                | <b>Tissue</b>       |         |           |          |        |        |           |
| <b>Batch</b>           | <b>R745214</b> |                     |         |           |          |        |        |           |
| <b>WG856600-5 CRM</b>  |                | <b>VA-NIST-2976</b> |         |           |          |        |        |           |
| Aluminum (Al)-Total    |                |                     | 102     |           | %        |        | 52-141 | 21-OCT-08 |
| Arsenic (As)-Total     |                |                     | 111     |           | %        |        | 83-137 | 21-OCT-08 |
| Cadmium (Cd)-Total     |                |                     | 105     |           | %        |        | 76-124 | 21-OCT-08 |
| Calcium (Ca)-Total     |                |                     | 98      |           | %        |        | 53-137 | 21-OCT-08 |
| Cobalt (Co)-Total      |                |                     | 103     |           | %        |        | 73-133 | 21-OCT-08 |
| Copper (Cu)-Total      |                |                     | 97      |           | %        |        | 80-119 | 21-OCT-08 |
| Lead (Pb)-Total        |                |                     | 101     |           | %        |        | 62-144 | 21-OCT-08 |
| Magnesium (Mg)-Total   |                |                     | 90      |           | %        |        | 56-118 | 21-OCT-08 |
| Manganese (Mn)-Total   |                |                     | 111     |           | %        |        | 65-160 | 21-OCT-08 |
| Zinc (Zn)-Total        |                |                     | 99      |           | %        |        | 80-128 | 21-OCT-08 |
| <b>WG856600-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |         |           |          |        |        |           |
| Arsenic (As)-Total     |                |                     | 105     |           | %        |        | 83-108 | 21-OCT-08 |
| Cadmium (Cd)-Total     |                |                     | 104     |           | %        |        | 91-122 | 21-OCT-08 |
| Copper (Cu)-Total      |                |                     | 89      |           | %        |        | 80-108 | 21-OCT-08 |
| Lead (Pb)-Total        |                |                     | 95      |           | %        |        | 67-141 | 21-OCT-08 |
| Manganese (Mn)-Total   |                |                     | 93      |           | %        |        | 81-110 | 21-OCT-08 |
| Molybdenum (Mo)-Total  |                |                     | 108     |           | %        |        | 87-115 | 21-OCT-08 |
| Nickel (Ni)-Total      |                |                     | 91      |           | %        |        | 75-109 | 21-OCT-08 |
| Strontium (Sr)-Total   |                |                     | 90      |           | %        |        | 77-111 | 21-OCT-08 |
| Vanadium (V)-Total     |                |                     | 109     |           | %        |        | 90-125 | 21-OCT-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>          | <b>R745214</b> |                     |        |           |       |      |        |           |
| <b>WG856600-6 CRM</b> |                | <b>VA-NRC-TORT2</b> |        |           |       |      |        |           |
| Zinc (Zn)-Total       |                |                     | 97     |           | %     |      | 84-118 | 21-OCT-08 |
| <b>WG856600-3 DUP</b> |                | <b>L677662-8</b>    |        |           |       |      |        |           |
| Antimony (Sb)-Total   |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Arsenic (As)-Total    |                | 8.09                | 8.26   |           | mg/kg | 2.2  | 45     | 21-OCT-08 |
| Barium (Ba)-Total     |                | 15.7                | 14.6   |           | mg/kg | 7.2  | 45     | 21-OCT-08 |
| Beryllium (Be)-Total  |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.815               | 0.770  |           | mg/kg | 5.7  | 45     | 21-OCT-08 |
| Calcium (Ca)-Total    |                | 28600               | 27400  |           | mg/kg | 4.3  | 45     | 21-OCT-08 |
| Cobalt (Co)-Total     |                | 0.12                | 0.11   | J         | mg/kg | 0.01 | 0.4    | 21-OCT-08 |
| Copper (Cu)-Total     |                | 7.21                | 6.53   |           | mg/kg | 9.8  | 45     | 21-OCT-08 |
| Lead (Pb)-Total       |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Lithium (Li)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Magnesium (Mg)-Total  |                | 1390                | 1410   |           | mg/kg | 0.95 | 45     | 21-OCT-08 |
| Manganese (Mn)-Total  |                | 15.6                | 14.5   |           | mg/kg | 7.4  | 45     | 21-OCT-08 |
| Strontium (Sr)-Total  |                | 110                 | 104    |           | mg/kg | 5.7  | 45     | 21-OCT-08 |
| Thallium (Tl)-Total   |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Tin (Sn)-Total        |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Uranium (U)-Total     |                | <0.010              | <0.010 | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Vanadium (V)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A  | 45     | 21-OCT-08 |
| Zinc (Zn)-Total       |                | 71.4                | 71.1   |           | mg/kg | 0.52 | 45     | 21-OCT-08 |
| <b>WG856600-1 MB</b>  |                |                     |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |      | 10     | 21-OCT-08 |
| Antimony (Sb)-Total   |                |                     | <0.050 |           | mg/kg |      | 0.05   | 21-OCT-08 |
| Arsenic (As)-Total    |                |                     | <0.050 |           | mg/kg |      | 0.05   | 21-OCT-08 |
| Barium (Ba)-Total     |                |                     | <0.050 |           | mg/kg |      | 0.05   | 21-OCT-08 |
| Beryllium (Be)-Total  |                |                     | <0.30  |           | mg/kg |      | 0.3    | 21-OCT-08 |
| Bismuth (Bi)-Total    |                |                     | <0.30  |           | mg/kg |      | 0.3    | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | <0.030 |           | mg/kg |      | 0.03   | 21-OCT-08 |
| Calcium (Ca)-Total    |                |                     | <10    |           | mg/kg |      | 10     | 21-OCT-08 |
| Chromium (Cr)-Total   |                |                     | <0.50  |           | mg/kg |      | 0.5    | 21-OCT-08 |
| Cobalt (Co)-Total     |                |                     | <0.10  |           | mg/kg |      | 0.1    | 21-OCT-08 |
| Copper (Cu)-Total     |                |                     | <0.050 |           | mg/kg |      | 0.05   | 21-OCT-08 |
| Lead (Pb)-Total       |                |                     | <0.10  |           | mg/kg |      | 0.1    | 21-OCT-08 |

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| Test                  | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b> |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R745214</b> |               |        |           |       |     |       |           |
| <b>WG856600-1</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 21-OCT-08 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 21-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 21-OCT-08 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 21-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Zinc (Zn)-Total       |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| <b>WG856600-2</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |               | <10    |           | mg/kg |     | 10    | 21-OCT-08 |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 21-OCT-08 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 21-OCT-08 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 21-OCT-08 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 21-OCT-08 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 21-OCT-08 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 21-OCT-08 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 21-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 21-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 21-OCT-08 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 21-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 21-OCT-08 |

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| Test                  | Matrix        | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|---------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b> |                     |        |           |       |     |        |           |
| <b>Batch R745214</b>  |               |                     |        |           |       |     |        |           |
| <b>WG856600-2 MB</b>  |               |                     |        |           |       |     |        |           |
| Zinc (Zn)-Total       |               |                     | <0.50  |           | mg/kg |     | 0.5    | 21-OCT-08 |
| <b>Batch R745914</b>  |               |                     |        |           |       |     |        |           |
| <b>WG858192-6 CRM</b> |               | <b>VA-NIST-2976</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |               |                     | 96     |           | %     |     | 52-141 | 23-OCT-08 |
| Arsenic (As)-Total    |               |                     | 107    |           | %     |     | 83-137 | 23-OCT-08 |
| Cadmium (Cd)-Total    |               |                     | 100    |           | %     |     | 76-124 | 23-OCT-08 |
| Calcium (Ca)-Total    |               |                     | 89     |           | %     |     | 53-137 | 23-OCT-08 |
| Cobalt (Co)-Total     |               |                     | 95     |           | %     |     | 73-133 | 23-OCT-08 |
| Copper (Cu)-Total     |               |                     | 101    |           | %     |     | 80-119 | 23-OCT-08 |
| Lead (Pb)-Total       |               |                     | 96     |           | %     |     | 62-144 | 23-OCT-08 |
| Magnesium (Mg)-Total  |               |                     | 81     |           | %     |     | 56-118 | 23-OCT-08 |
| Manganese (Mn)-Total  |               |                     | 110    |           | %     |     | 65-160 | 23-OCT-08 |
| Zinc (Zn)-Total       |               |                     | 96     |           | %     |     | 80-128 | 23-OCT-08 |
| <b>WG858192-7 CRM</b> |               | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Arsenic (As)-Total    |               |                     | 105    |           | %     |     | 83-108 | 23-OCT-08 |
| Cadmium (Cd)-Total    |               |                     | 104    |           | %     |     | 91-122 | 23-OCT-08 |
| Copper (Cu)-Total     |               |                     | 88     |           | %     |     | 80-108 | 23-OCT-08 |
| Lead (Pb)-Total       |               |                     | 94     |           | %     |     | 67-141 | 23-OCT-08 |
| Manganese (Mn)-Total  |               |                     | 92     |           | %     |     | 81-110 | 23-OCT-08 |
| Molybdenum (Mo)-Total |               |                     | 106    |           | %     |     | 87-115 | 23-OCT-08 |
| Nickel (Ni)-Total     |               |                     | 89     |           | %     |     | 75-109 | 23-OCT-08 |
| Strontium (Sr)-Total  |               |                     | 83     |           | %     |     | 77-111 | 23-OCT-08 |
| Vanadium (V)-Total    |               |                     | 110    |           | %     |     | 90-125 | 23-OCT-08 |
| Zinc (Zn)-Total       |               |                     | 98     |           | %     |     | 84-118 | 23-OCT-08 |
| <b>WG858192-1 MB</b>  |               |                     |        |           |       |     |        |           |
| Aluminum (Al)-Total   |               |                     | <10    |           | mg/kg |     | 10     | 23-OCT-08 |
| Antimony (Sb)-Total   |               |                     | <0.050 |           | mg/kg |     | 0.05   | 23-OCT-08 |
| Arsenic (As)-Total    |               |                     | <0.050 |           | mg/kg |     | 0.05   | 23-OCT-08 |
| Barium (Ba)-Total     |               |                     | <0.050 |           | mg/kg |     | 0.05   | 23-OCT-08 |
| Beryllium (Be)-Total  |               |                     | <0.30  |           | mg/kg |     | 0.3    | 23-OCT-08 |
| Bismuth (Bi)-Total    |               |                     | <0.30  |           | mg/kg |     | 0.3    | 23-OCT-08 |
| Cadmium (Cd)-Total    |               |                     | <0.030 |           | mg/kg |     | 0.03   | 23-OCT-08 |
| Calcium (Ca)-Total    |               |                     | <10    |           | mg/kg |     | 10     | 23-OCT-08 |

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| Test                  | Matrix         | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|-----------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b>  |           |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R745914</b> |           |        |           |       |     |       |           |
| <b>WG858192-1 MB</b>  |                |           |        |           |       |     |       |           |
| Chromium (Cr)-Total   |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Cobalt (Co)-Total     |                |           | <0.10  |           | mg/kg |     | 0.1   | 23-OCT-08 |
| Copper (Cu)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Lead (Pb)-Total       |                |           | <0.10  |           | mg/kg |     | 0.1   | 23-OCT-08 |
| Lithium (Li)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Magnesium (Mg)-Total  |                |           | <3.0   |           | mg/kg |     | 3     | 23-OCT-08 |
| Manganese (Mn)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Molybdenum (Mo)-Total |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Nickel (Ni)-Total     |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Strontium (Sr)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Thallium (Tl)-Total   |                |           | <0.030 |           | mg/kg |     | 0.03  | 23-OCT-08 |
| Tin (Sn)-Total        |                |           | <0.20  |           | mg/kg |     | 0.2   | 23-OCT-08 |
| Uranium (U)-Total     |                |           | <0.010 |           | mg/kg |     | 0.01  | 23-OCT-08 |
| Vanadium (V)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Zinc (Zn)-Total       |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| <b>WG858192-2 MB</b>  |                |           |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |           | <10    |           | mg/kg |     | 10    | 23-OCT-08 |
| Antimony (Sb)-Total   |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Arsenic (As)-Total    |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Barium (Ba)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Beryllium (Be)-Total  |                |           | <0.30  |           | mg/kg |     | 0.3   | 23-OCT-08 |
| Bismuth (Bi)-Total    |                |           | <0.30  |           | mg/kg |     | 0.3   | 23-OCT-08 |
| Cadmium (Cd)-Total    |                |           | <0.030 |           | mg/kg |     | 0.03  | 23-OCT-08 |
| Calcium (Ca)-Total    |                |           | <10    |           | mg/kg |     | 10    | 23-OCT-08 |
| Chromium (Cr)-Total   |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Cobalt (Co)-Total     |                |           | <0.10  |           | mg/kg |     | 0.1   | 23-OCT-08 |
| Copper (Cu)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Lead (Pb)-Total       |                |           | <0.10  |           | mg/kg |     | 0.1   | 23-OCT-08 |
| Lithium (Li)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Magnesium (Mg)-Total  |                |           | <3.0   |           | mg/kg |     | 3     | 23-OCT-08 |
| Manganese (Mn)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Molybdenum (Mo)-Total |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |
| Nickel (Ni)-Total     |                |           | <0.50  |           | mg/kg |     | 0.5   | 23-OCT-08 |
| Strontium (Sr)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 23-OCT-08 |

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| Test                  | Matrix         | Reference         | Result | Qualifier | Units | RPD   | Limit | Analyzed  |
|-----------------------|----------------|-------------------|--------|-----------|-------|-------|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>     |        |           |       |       |       |           |
| <b>Batch</b>          | <b>R745914</b> |                   |        |           |       |       |       |           |
| <b>WG858192-2</b>     | <b>MB</b>      |                   |        |           |       |       |       |           |
| Thallium (Tl)-Total   |                |                   | <0.030 |           | mg/kg |       | 0.03  | 23-OCT-08 |
| Tin (Sn)-Total        |                |                   | <0.20  |           | mg/kg |       | 0.2   | 23-OCT-08 |
| Uranium (U)-Total     |                |                   | <0.010 |           | mg/kg |       | 0.01  | 23-OCT-08 |
| Vanadium (V)-Total    |                |                   | <0.50  |           | mg/kg |       | 0.5   | 23-OCT-08 |
| Zinc (Zn)-Total       |                |                   | <0.50  |           | mg/kg |       | 0.5   | 23-OCT-08 |
| <b>Batch</b>          | <b>R746024</b> |                   |        |           |       |       |       |           |
| <b>WG856600-3</b>     | <b>DUP</b>     | <b>L677662-8</b>  |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                | 29                | 22     | J         | mg/kg | 8     | 40    | 23-OCT-08 |
| Chromium (Cr)-Total   |                | 2.20              | 1.69   | J         | mg/kg | 0.51  | 2     | 23-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.237             | 0.186  | J         | mg/kg | 0.051 | 0.2   | 23-OCT-08 |
| Nickel (Ni)-Total     |                | 1.27              | 0.91   | J         | mg/kg | 0.36  | 2     | 23-OCT-08 |
| <b>WG856600-4</b>     | <b>DUP</b>     | <b>L677662-23</b> |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                | 115               | 87     | J         | mg/kg | 27    | 80    | 23-OCT-08 |
| Antimony (Sb)-Total   |                | <0.10             | <0.10  | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Arsenic (As)-Total    |                | 0.13              | 0.14   | J         | mg/kg | 0.00  | 0.4   | 23-OCT-08 |
| Barium (Ba)-Total     |                | 16.2              | 9.91   | DUP-H     | mg/kg | 48    | 45    | 23-OCT-08 |
| Beryllium (Be)-Total  |                | <0.60             | <0.60  | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.60             | <0.60  | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.134             | 0.128  | J         | mg/kg | 0.007 | 0.24  | 23-OCT-08 |
| Calcium (Ca)-Total    |                | 52400             | 27100  | DUP-H     | mg/kg | 63    | 45    | 23-OCT-08 |
| Chromium (Cr)-Total   |                | 3.6               | 4.0    | J         | mg/kg | 0.3   | 4     | 23-OCT-08 |
| Cobalt (Co)-Total     |                | <0.20             | <0.20  | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Copper (Cu)-Total     |                | 2.54              | 2.50   |           | mg/kg | 1.5   | 45    | 23-OCT-08 |
| Lead (Pb)-Total       |                | 0.25              | 0.21   | J         | mg/kg | 0.04  | 0.8   | 23-OCT-08 |
| Lithium (Li)-Total    |                | <1.0              | <1.0   | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Magnesium (Mg)-Total  |                | 1990              | 1480   |           | mg/kg | 30    | 45    | 23-OCT-08 |
| Manganese (Mn)-Total  |                | 55.3              | 31.4   | DUP-H     | mg/kg | 55    | 45    | 23-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.52              | 0.49   | J         | mg/kg | 0.03  | 0.4   | 23-OCT-08 |
| Nickel (Ni)-Total     |                | 2.2               | 2.7    | J         | mg/kg | 0.6   | 4     | 23-OCT-08 |
| Strontium (Sr)-Total  |                | 163               | 90.8   | DUP-H     | mg/kg | 57    | 45    | 23-OCT-08 |
| Thallium (Tl)-Total   |                | <0.060            | <0.060 | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Tin (Sn)-Total        |                | <0.40             | <0.40  | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Uranium (U)-Total     |                | <0.020            | <0.020 | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |
| Vanadium (V)-Total    |                | <1.0              | <1.0   | RPD-NA    | mg/kg | N/A   | 45    | 23-OCT-08 |

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| Test                  | Matrix         | Reference         | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|-----------------------|----------------|-------------------|--------|-----------|-------|------|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>     |        |           |       |      |       |           |
| <b>Batch</b>          | <b>R746024</b> |                   |        |           |       |      |       |           |
| <b>WG856600-4</b>     | <b>DUP</b>     | <b>L677662-23</b> |        |           |       |      |       |           |
| Zinc (Zn)-Total       |                | 83.0              | 69.9   |           | mg/kg | 17   | 45    | 23-OCT-08 |
| <b>Batch</b>          | <b>R746582</b> |                   |        |           |       |      |       |           |
| <b>WG858192-3</b>     | <b>DUP</b>     | <b>L677662-34</b> |        |           |       |      |       |           |
| Aluminum (Al)-Total   |                | 83                | <80    | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | N/A               | <0.40  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | 1.09              | 1.19   | J         | mg/kg | 0.09 | 1.6   | 24-OCT-08 |
| Barium (Ba)-Total     |                | 14.7              | 18.3   |           | mg/kg | 22   | 45    | 24-OCT-08 |
| Beryllium (Be)-Total  |                | N/A               | <2.4   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | N/A               | <2.4   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Cadmium (Cd)-Total    |                | N/A               | 0.42   | J         | mg/kg | 0.05 | 0.96  | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 41300             | 51400  |           | mg/kg | 22   | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | N/A               | <4.0   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Cobalt (Co)-Total     |                | N/A               | <0.80  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Copper (Cu)-Total     |                | 4.37              | 4.32   |           | mg/kg | 1.1  | 45    | 24-OCT-08 |
| Lead (Pb)-Total       |                | N/A               | <0.80  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Lithium (Li)-Total    |                | N/A               | <4.0   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 1690              | 2000   |           | mg/kg | 17   | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 28.3              | 35.9   |           | mg/kg | 24   | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | N/A               | <0.40  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Nickel (Ni)-Total     |                | N/A               | <4.0   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 160               | 207    |           | mg/kg | 25   | 45    | 24-OCT-08 |
| Thallium (Tl)-Total   |                | N/A               | <0.24  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Tin (Sn)-Total        |                | N/A               | <1.6   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Uranium (U)-Total     |                | N/A               | <0.080 | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Vanadium (V)-Total    |                | N/A               | <4.0   | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Zinc (Zn)-Total       |                | 124               | 142    |           | mg/kg | 14   | 45    | 24-OCT-08 |
| <b>WG858192-4</b>     | <b>DUP</b>     | <b>L677662-28</b> |        |           |       |      |       |           |
| Aluminum (Al)-Total   |                | 1550              | 1470   |           | mg/kg | 5.4  | 45    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | N/A               | <0.10  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | N/A               | 0.31   | J         | mg/kg | 0.01 | 0.4   | 24-OCT-08 |
| Barium (Ba)-Total     |                | 139               | 110    |           | mg/kg | 23   | 45    | 24-OCT-08 |
| Beryllium (Be)-Total  |                | N/A               | <0.60  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | N/A               | <0.60  | RPD-NA    | mg/kg | N/A  | 45    | 24-OCT-08 |



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| Test                  | Matrix         | Reference         | Result | Qualifier | Units | RPD   | Limit | Analyzed  |
|-----------------------|----------------|-------------------|--------|-----------|-------|-------|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>     |        |           |       |       |       |           |
| <b>Batch</b>          | <b>R746582</b> |                   |        |           |       |       |       |           |
| <b>WG858192-4</b>     | <b>DUP</b>     | <b>L677662-28</b> |        |           |       |       |       |           |
| Cadmium (Cd)-Total    |                | N/A               | 0.180  | J         | mg/kg | 0.008 | 0.24  | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 68100             | 54900  |           | mg/kg | 21    | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | 18.7              | 20.0   |           | mg/kg | 6.7   | 45    | 24-OCT-08 |
| Cobalt (Co)-Total     |                | 1.95              | 1.94   | J         | mg/kg | 0.01  | 0.8   | 24-OCT-08 |
| Copper (Cu)-Total     |                | 6.94              | 6.75   |           | mg/kg | 2.8   | 45    | 24-OCT-08 |
| Lead (Pb)-Total       |                | 0.87              | 0.79   | J         | mg/kg | 0.09  | 0.8   | 24-OCT-08 |
| Lithium (Li)-Total    |                | N/A               | <1.0   | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 1830              | 1550   |           | mg/kg | 17    | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 343               | 291    |           | mg/kg | 17    | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | 4.55              | 4.03   |           | mg/kg | 12    | 45    | 24-OCT-08 |
| Nickel (Ni)-Total     |                | 10.1              | 10.9   |           | mg/kg | 7.5   | 45    | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 273               | 215    |           | mg/kg | 24    | 45    | 24-OCT-08 |
| Thallium (Tl)-Total   |                | N/A               | <0.060 | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Tin (Sn)-Total        |                | N/A               | <0.40  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Uranium (U)-Total     |                | N/A               | 0.031  | J         | mg/kg | 0.002 | 0.08  | 24-OCT-08 |
| Vanadium (V)-Total    |                | 7.5               | 7.3    | J         | mg/kg | 0.2   | 4     | 24-OCT-08 |
| Zinc (Zn)-Total       |                | 58.6              | 55.6   |           | mg/kg | 5.4   | 45    | 24-OCT-08 |
| <b>WG858192-5</b>     | <b>DUP</b>     | <b>L677662-50</b> |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                | 31                | <60    | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | <0.10             | <0.30  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | 4.65              | 4.38   |           | mg/kg | 6.0   | 45    | 24-OCT-08 |
| Barium (Ba)-Total     |                | 2.10              | 2.14   | J         | mg/kg | 0.04  | 1.2   | 24-OCT-08 |
| Beryllium (Be)-Total  |                | <0.60             | <1.8   | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.60             | <1.8   | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.154             | <0.18  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 46200             | 40900  |           | mg/kg | 12    | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | 2.2               | <3.0   | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Cobalt (Co)-Total     |                | <0.20             | <0.60  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Copper (Cu)-Total     |                | 2.76              | 2.65   | J         | mg/kg | 0.11  | 1.2   | 24-OCT-08 |
| Lead (Pb)-Total       |                | <0.20             | <0.60  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Lithium (Li)-Total    |                | <1.0              | <3.0   | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 1750              | 1670   |           | mg/kg | 4.6   | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 3.37              | 3.07   |           | mg/kg | 9.2   | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.23              | <0.30  | RPD-NA    | mg/kg | N/A   | 45    | 24-OCT-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|----------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |          |     |        |           |
| <b>Batch</b>          | <b>R746582</b> |                     |        |           |          |     |        |           |
| <b>WG858192-5</b>     | <b>DUP</b>     | <b>L677662-50</b>   |        |           |          |     |        |           |
| Nickel (Ni)-Total     |                | 1.2                 | <3.0   | RPD-NA    | mg/kg    | N/A | 45     | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 226                 | 210    |           | mg/kg    | 7.5 | 45     | 24-OCT-08 |
| Thallium (Tl)-Total   |                | <0.060              | <0.18  | RPD-NA    | mg/kg    | N/A | 45     | 24-OCT-08 |
| Tin (Sn)-Total        |                | <0.40               | <1.2   | RPD-NA    | mg/kg    | N/A | 45     | 24-OCT-08 |
| Uranium (U)-Total     |                | 0.027               | <0.060 | RPD-NA    | mg/kg    | N/A | 45     | 24-OCT-08 |
| Vanadium (V)-Total    |                | <1.0                | <3.0   | RPD-NA    | mg/kg    | N/A | 45     | 24-OCT-08 |
| Zinc (Zn)-Total       |                | 77.2                | 74.0   |           | mg/kg    | 4.2 | 45     | 24-OCT-08 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |          |     |        |           |
| <b>Batch</b>          | <b>R745198</b> |                     |        |           |          |     |        |           |
| <b>WG856600-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | 102    |           | %        |     | 52-141 | 21-OCT-08 |
| Arsenic (As)-Total    |                |                     | 111    |           | %        |     | 83-137 | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | 105    |           | %        |     | 76-124 | 21-OCT-08 |
| Calcium (Ca)-Total    |                |                     | 98     |           | %        |     | 53-137 | 21-OCT-08 |
| Cobalt (Co)-Total     |                |                     | 103    |           | %        |     | 73-133 | 21-OCT-08 |
| Copper (Cu)-Total     |                |                     | 97     |           | %        |     | 80-119 | 21-OCT-08 |
| Lead (Pb)-Total       |                |                     | 101    |           | %        |     | 62-144 | 21-OCT-08 |
| Magnesium (Mg)-Total  |                |                     | 90     |           | %        |     | 56-118 | 21-OCT-08 |
| Manganese (Mn)-Total  |                |                     | 111    |           | %        |     | 65-160 | 21-OCT-08 |
| Zinc (Zn)-Total       |                |                     | 99     |           | %        |     | 80-128 | 21-OCT-08 |
| <b>WG856600-6</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |          |     |        |           |
| Arsenic (As)-Total    |                |                     | 105    |           | %        |     | 83-108 | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | 104    |           | %        |     | 91-122 | 21-OCT-08 |
| Copper (Cu)-Total     |                |                     | 89     |           | %        |     | 80-108 | 21-OCT-08 |
| Lead (Pb)-Total       |                |                     | 95     |           | %        |     | 67-141 | 21-OCT-08 |
| Manganese (Mn)-Total  |                |                     | 93     |           | %        |     | 81-110 | 21-OCT-08 |
| Molybdenum (Mo)-Total |                |                     | 108    |           | %        |     | 87-115 | 21-OCT-08 |
| Nickel (Ni)-Total     |                |                     | 91     |           | %        |     | 75-109 | 21-OCT-08 |
| Strontium (Sr)-Total  |                |                     | 90     |           | %        |     | 77-111 | 21-OCT-08 |
| Vanadium (V)-Total    |                |                     | 109    |           | %        |     | 90-125 | 21-OCT-08 |
| Zinc (Zn)-Total       |                |                     | 97     |           | %        |     | 84-118 | 21-OCT-08 |
| <b>WG856600-3</b>     | <b>DUP</b>     | <b>L677662-8</b>    |        |           |          |     |        |           |
| Antimony (Sb)-Total   |                | <0.010              | <0.010 | RPD-NA    | mg/kg ww | N/A | 45     | 21-OCT-08 |
| Arsenic (As)-Total    |                | 2.11                | 2.16   |           | mg/kg ww | 2.2 | 45     | 21-OCT-08 |

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| Test                  | Matrix         | Reference        | Result  | Qualifier | Units    | RPD   | Limit | Analyzed  |
|-----------------------|----------------|------------------|---------|-----------|----------|-------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>    |         |           |          |       |       |           |
| <b>Batch</b>          | <b>R745198</b> |                  |         |           |          |       |       |           |
| <b>WG856600-3</b>     | <b>DUP</b>     | <b>L677662-8</b> |         |           |          |       |       |           |
| Barium (Ba)-Total     |                | 4.10             | 3.82    |           | mg/kg ww | 7.2   | 45    | 21-OCT-08 |
| Beryllium (Be)-Total  |                | <0.10            | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.030           | <0.030  | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.213            | 0.201   |           | mg/kg ww | 5.7   | 45    | 21-OCT-08 |
| Calcium (Ca)-Total    |                | 7450             | 7140    |           | mg/kg ww | 4.3   | 45    | 21-OCT-08 |
| Cobalt (Co)-Total     |                | 0.031            | 0.029   | J         | mg/kg ww | 0.002 | 0.08  | 21-OCT-08 |
| Copper (Cu)-Total     |                | 1.88             | 1.71    |           | mg/kg ww | 9.8   | 45    | 21-OCT-08 |
| Lead (Pb)-Total       |                | <0.020           | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Lithium (Li)-Total    |                | <0.10            | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Magnesium (Mg)-Total  |                | 364              | 367     |           | mg/kg ww | 0.95  | 45    | 21-OCT-08 |
| Manganese (Mn)-Total  |                | 4.07             | 3.78    |           | mg/kg ww | 7.4   | 45    | 21-OCT-08 |
| Strontium (Sr)-Total  |                | 28.8             | 27.3    |           | mg/kg ww | 5.7   | 45    | 21-OCT-08 |
| Thallium (Tl)-Total   |                | <0.010           | <0.010  | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Tin (Sn)-Total        |                | <0.050           | <0.050  | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Uranium (U)-Total     |                | <0.0020          | <0.0020 | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Vanadium (V)-Total    |                | <0.10            | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45    | 21-OCT-08 |
| Zinc (Zn)-Total       |                | 18.6             | 18.6    |           | mg/kg ww | 0.52  | 45    | 21-OCT-08 |
| <b>WG856600-1</b>     | <b>MB</b>      |                  |         |           |          |       |       |           |
| Aluminum (Al)-Total   |                |                  | <2.0    |           | mg/kg ww |       | 2     | 21-OCT-08 |
| Antimony (Sb)-Total   |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |
| Arsenic (As)-Total    |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |
| Barium (Ba)-Total     |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |
| Beryllium (Be)-Total  |                |                  | <0.10   |           | mg/kg ww |       | 0.1   | 21-OCT-08 |
| Bismuth (Bi)-Total    |                |                  | <0.030  |           | mg/kg ww |       | 0.03  | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |                  | <0.0050 |           | mg/kg ww |       | 0.005 | 21-OCT-08 |
| Calcium (Ca)-Total    |                |                  | <2.0    |           | mg/kg ww |       | 2     | 21-OCT-08 |
| Chromium (Cr)-Total   |                |                  | <0.10   |           | mg/kg ww |       | 0.1   | 21-OCT-08 |
| Cobalt (Co)-Total     |                |                  | <0.020  |           | mg/kg ww |       | 0.02  | 21-OCT-08 |
| Copper (Cu)-Total     |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |
| Lead (Pb)-Total       |                |                  | <0.020  |           | mg/kg ww |       | 0.02  | 21-OCT-08 |
| Lithium (Li)-Total    |                |                  | <0.10   |           | mg/kg ww |       | 0.1   | 21-OCT-08 |
| Magnesium (Mg)-Total  |                |                  | <1.0    |           | mg/kg ww |       | 1     | 21-OCT-08 |
| Manganese (Mn)-Total  |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |
| Molybdenum (Mo)-Total |                |                  | <0.010  |           | mg/kg ww |       | 0.01  | 21-OCT-08 |

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R745198</b> |               |         |           |          |     |       |           |
| <b>WG856600-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 21-OCT-08 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 21-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| <b>WG856600-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 21-OCT-08 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 21-OCT-08 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 21-OCT-08 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 21-OCT-08 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 21-OCT-08 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 21-OCT-08 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 21-OCT-08 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 21-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 21-OCT-08 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 21-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 21-OCT-08 |

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units     | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|-----------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>          | <b>R745926</b> |                     |         |           |           |     |        |           |
| <b>WG858192-6 CRM</b> |                | <b>VA-NIST-2976</b> |         |           |           |     |        |           |
| Aluminum (Al)-Total   |                |                     | 96      |           | %         |     | 52-141 | 23-OCT-08 |
| Arsenic (As)-Total    |                |                     | 107     |           | %         |     | 83-137 | 23-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | 100     |           | %         |     | 76-124 | 23-OCT-08 |
| Calcium (Ca)-Total    |                |                     | 89      |           | %         |     | 53-137 | 23-OCT-08 |
| Cobalt (Co)-Total     |                |                     | 95      |           | %         |     | 73-133 | 23-OCT-08 |
| Copper (Cu)-Total     |                |                     | 101     |           | %         |     | 80-119 | 23-OCT-08 |
| Lead (Pb)-Total       |                |                     | 96      |           | %         |     | 62-144 | 23-OCT-08 |
| Magnesium (Mg)-Total  |                |                     | 81      |           | %         |     | 56-118 | 23-OCT-08 |
| Manganese (Mn)-Total  |                |                     | 110     |           | %         |     | 65-160 | 23-OCT-08 |
| Zinc (Zn)-Total       |                |                     | 96      |           | %         |     | 80-128 | 23-OCT-08 |
| <b>WG858192-7 CRM</b> |                | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Arsenic (As)-Total    |                |                     | 105     |           | %         |     | 83-108 | 23-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | 104     |           | %         |     | 91-122 | 23-OCT-08 |
| Copper (Cu)-Total     |                |                     | 88      |           | %         |     | 80-108 | 23-OCT-08 |
| Lead (Pb)-Total       |                |                     | 94      |           | %         |     | 67-141 | 23-OCT-08 |
| Manganese (Mn)-Total  |                |                     | 92      |           | %         |     | 81-110 | 23-OCT-08 |
| Molybdenum (Mo)-Total |                |                     | 106     |           | %         |     | 87-115 | 23-OCT-08 |
| Nickel (Ni)-Total     |                |                     | 89      |           | %         |     | 75-109 | 23-OCT-08 |
| Strontium (Sr)-Total  |                |                     | 83      |           | %         |     | 77-111 | 23-OCT-08 |
| Vanadium (V)-Total    |                |                     | 110     |           | %         |     | 90-125 | 23-OCT-08 |
| Zinc (Zn)-Total       |                |                     | 98      |           | %         |     | 84-118 | 23-OCT-08 |
| <b>WG858192-1 MB</b>  |                |                     |         |           |           |     |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0    |           | mg/kg wwt |     | 2      | 23-OCT-08 |
| Antimony (Sb)-Total   |                |                     | <0.010  |           | mg/kg wwt |     | 0.01   | 23-OCT-08 |
| Arsenic (As)-Total    |                |                     | <0.010  |           | mg/kg wwt |     | 0.01   | 23-OCT-08 |
| Barium (Ba)-Total     |                |                     | <0.010  |           | mg/kg wwt |     | 0.01   | 23-OCT-08 |
| Beryllium (Be)-Total  |                |                     | <0.10   |           | mg/kg wwt |     | 0.1    | 23-OCT-08 |
| Bismuth (Bi)-Total    |                |                     | <0.030  |           | mg/kg wwt |     | 0.03   | 23-OCT-08 |
| Cadmium (Cd)-Total    |                |                     | <0.0050 |           | mg/kg wwt |     | 0.005  | 23-OCT-08 |
| Calcium (Ca)-Total    |                |                     | <2.0    |           | mg/kg wwt |     | 2      | 23-OCT-08 |
| Chromium (Cr)-Total   |                |                     | <0.10   |           | mg/kg wwt |     | 0.1    | 23-OCT-08 |
| Cobalt (Co)-Total     |                |                     | <0.020  |           | mg/kg wwt |     | 0.02   | 23-OCT-08 |
| Copper (Cu)-Total     |                |                     | <0.010  |           | mg/kg wwt |     | 0.01   | 23-OCT-08 |
| Lead (Pb)-Total       |                |                     | <0.020  |           | mg/kg wwt |     | 0.02   | 23-OCT-08 |

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R745926</b> |               |         |           |          |     |       |           |
| <b>WG858192-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 23-OCT-08 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 23-OCT-08 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 23-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| <b>WG858192-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 23-OCT-08 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 23-OCT-08 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 23-OCT-08 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 23-OCT-08 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 23-OCT-08 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 23-OCT-08 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 23-OCT-08 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 23-OCT-08 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 23-OCT-08 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 23-OCT-08 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 23-OCT-08 |

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| Test                  | Matrix         | Reference         | Result  | Qualifier | Units    | RPD   | Limit | Analyzed  |
|-----------------------|----------------|-------------------|---------|-----------|----------|-------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>     |         |           |          |       |       |           |
| <b>Batch</b>          | <b>R745926</b> |                   |         |           |          |       |       |           |
| <b>WG858192-2</b>     | <b>MB</b>      |                   |         |           |          |       |       |           |
| Zinc (Zn)-Total       |                |                   | <0.10   |           | mg/kg ww |       | 0.1   | 23-OCT-08 |
| <b>Batch</b>          | <b>R746015</b> |                   |         |           |          |       |       |           |
| <b>WG856600-3</b>     | <b>DUP</b>     | <b>L677662-8</b>  |         |           |          |       |       |           |
| Aluminum (Al)-Total   |                | 7.7               | 5.7     | J         | mg/kg ww | 2.0   | 8     | 23-OCT-08 |
| Chromium (Cr)-Total   |                | 0.58              | 0.44    | J         | mg/kg ww | 0.13  | 0.4   | 23-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.062             | 0.049   | J         | mg/kg ww | 0.013 | 0.04  | 23-OCT-08 |
| Nickel (Ni)-Total     |                | 0.33              | 0.24    | J         | mg/kg ww | 0.09  | 0.4   | 23-OCT-08 |
| <b>WG856600-4</b>     | <b>DUP</b>     | <b>L677662-23</b> |         |           |          |       |       |           |
| Aluminum (Al)-Total   |                | 26.1              | 19.9    | J         | mg/kg ww | 6.2   | 16    | 23-OCT-08 |
| Antimony (Sb)-Total   |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Arsenic (As)-Total    |                | 0.030             | 0.031   | J         | mg/kg ww | 0.001 | 0.08  | 23-OCT-08 |
| Barium (Ba)-Total     |                | 3.70              | 2.26    | DUP-H     | mg/kg ww | 48    | 45    | 23-OCT-08 |
| Beryllium (Be)-Total  |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.060            | <0.060  | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.031             | 0.029   | J         | mg/kg ww | 0.002 | 0.04  | 23-OCT-08 |
| Calcium (Ca)-Total    |                | 11900             | 6180    | DUP-H     | mg/kg ww | 63    | 45    | 23-OCT-08 |
| Chromium (Cr)-Total   |                | 0.82              | 0.90    | J         | mg/kg ww | 0.08  | 0.8   | 23-OCT-08 |
| Cobalt (Co)-Total     |                | <0.040            | <0.040  | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Copper (Cu)-Total     |                | 0.579             | 0.570   |           | mg/kg ww | 1.5   | 45    | 23-OCT-08 |
| Lead (Pb)-Total       |                | 0.058             | 0.048   | J         | mg/kg ww | 0.009 | 0.16  | 23-OCT-08 |
| Lithium (Li)-Total    |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Magnesium (Mg)-Total  |                | 452               | 336     |           | mg/kg ww | 30    | 45    | 23-OCT-08 |
| Manganese (Mn)-Total  |                | 12.6              | 7.15    | DUP-H     | mg/kg ww | 55    | 45    | 23-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.117             | 0.111   | J         | mg/kg ww | 0.007 | 0.08  | 23-OCT-08 |
| Nickel (Ni)-Total     |                | 0.50              | 0.62    | J         | mg/kg ww | 0.13  | 0.8   | 23-OCT-08 |
| Strontium (Sr)-Total  |                | 37.1              | 20.7    | DUP-H     | mg/kg ww | 57    | 45    | 23-OCT-08 |
| Thallium (Tl)-Total   |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Tin (Sn)-Total        |                | <0.10             | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Uranium (U)-Total     |                | <0.0040           | <0.0040 | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Vanadium (V)-Total    |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 23-OCT-08 |
| Zinc (Zn)-Total       |                | 18.9              | 15.9    |           | mg/kg ww | 17    | 45    | 23-OCT-08 |

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| Test                  | Matrix         | Reference         | Result  | Qualifier | Units    | RPD   | Limit | Analyzed  |
|-----------------------|----------------|-------------------|---------|-----------|----------|-------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>     |         |           |          |       |       |           |
| <b>Batch</b>          | <b>R746569</b> |                   |         |           |          |       |       |           |
| <b>WG858192-3</b>     | <b>DUP</b>     | <b>L677662-34</b> |         |           |          |       |       |           |
| Aluminum (Al)-Total   |                | 19.1              | 17.2    | J         | mg/kg ww | 1.8   | 16    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | 0.251             | 0.272   |           | mg/kg ww | 8.0   | 45    | 24-OCT-08 |
| Barium (Ba)-Total     |                | 3.36              | 4.20    |           | mg/kg ww | 22    | 45    | 24-OCT-08 |
| Beryllium (Be)-Total  |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.060            | <0.060  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.084             | 0.096   | J         | mg/kg ww | 0.012 | 0.04  | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 9470              | 11800   |           | mg/kg ww | 22    | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | 0.59              | 0.61    | J         | mg/kg ww | 0.02  | 0.8   | 24-OCT-08 |
| Cobalt (Co)-Total     |                | <0.040            | <0.040  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Copper (Cu)-Total     |                | 1.00              | 0.992   |           | mg/kg ww | 1.1   | 45    | 24-OCT-08 |
| Lead (Pb)-Total       |                | <0.040            | <0.040  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Lithium (Li)-Total    |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 388               | 458     |           | mg/kg ww | 17    | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 6.49              | 8.24    |           | mg/kg ww | 24    | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.046             | 0.046   | J         | mg/kg ww | 0.001 | 0.08  | 24-OCT-08 |
| Nickel (Ni)-Total     |                | 0.33              | 0.34    | J         | mg/kg ww | 0.02  | 0.8   | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 36.8              | 47.5    |           | mg/kg ww | 25    | 45    | 24-OCT-08 |
| Thallium (Tl)-Total   |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Tin (Sn)-Total        |                | <0.10             | <0.10   | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Uranium (U)-Total     |                | <0.0040           | <0.0040 | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Vanadium (V)-Total    |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Zinc (Zn)-Total       |                | 28.4              | 32.6    |           | mg/kg ww | 14    | 45    | 24-OCT-08 |
| <b>WG858192-4</b>     | <b>DUP</b>     | <b>L677662-28</b> |         |           |          |       |       |           |
| Aluminum (Al)-Total   |                | 390               | 369     |           | mg/kg ww | 5.4   | 45    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | 0.075             | 0.077   | J         | mg/kg ww | 0.003 | 0.08  | 24-OCT-08 |
| Barium (Ba)-Total     |                | 34.8              | 27.6    |           | mg/kg ww | 23    | 45    | 24-OCT-08 |
| Beryllium (Be)-Total  |                | <0.20             | <0.20   | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.060            | <0.060  | RPD-NA    | mg/kg ww | N/A   | 45    | 24-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.047             | 0.045   | J         | mg/kg ww | 0.002 | 0.04  | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 17100             | 13800   |           | mg/kg ww | 21    | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | 4.69              | 5.01    |           | mg/kg ww | 6.7   | 45    | 24-OCT-08 |
| Cobalt (Co)-Total     |                | 0.491             | 0.488   |           | mg/kg ww | 0.49  | 45    | 24-OCT-08 |



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| Test                  | Matrix         | Reference         | Result | Qualifier | Units    | RPD    | Limit | Analyzed  |
|-----------------------|----------------|-------------------|--------|-----------|----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>     |        |           |          |        |       |           |
| <b>Batch</b>          | <b>R746569</b> |                   |        |           |          |        |       |           |
| <b>WG858192-4</b>     | <b>DUP</b>     | <b>L677662-28</b> |        |           |          |        |       |           |
| Copper (Cu)-Total     |                | 1.74              | 1.70   |           | mg/kg ww | 2.8    | 45    | 24-OCT-08 |
| Lead (Pb)-Total       |                | 0.220             | 0.198  | J         | mg/kg ww | 0.022  | 0.16  | 24-OCT-08 |
| Lithium (Li)-Total    |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 460               | 389    |           | mg/kg ww | 17     | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 86.2              | 73.0   |           | mg/kg ww | 17     | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | 1.14              | 1.01   |           | mg/kg ww | 12     | 45    | 24-OCT-08 |
| Nickel (Ni)-Total     |                | 2.54              | 2.73   |           | mg/kg ww | 7.5    | 45    | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 68.5              | 54.0   |           | mg/kg ww | 24     | 45    | 24-OCT-08 |
| Thallium (Tl)-Total   |                | <0.020            | <0.020 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Tin (Sn)-Total        |                | <0.10             | <0.10  | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Uranium (U)-Total     |                | 0.0083            | 0.0078 | J         | mg/kg ww | 0.0004 | 0.016 | 24-OCT-08 |
| Vanadium (V)-Total    |                | 1.89              | 1.83   | J         | mg/kg ww | 0.06   | 0.8   | 24-OCT-08 |
| Zinc (Zn)-Total       |                | 14.7              | 14.0   |           | mg/kg ww | 5.4    | 45    | 24-OCT-08 |
| <b>WG858192-5</b>     | <b>DUP</b>     | <b>L677662-50</b> |        |           |          |        |       |           |
| Aluminum (Al)-Total   |                | 8.1               | 8.5    | J         | mg/kg ww | 0.4    | 16    | 24-OCT-08 |
| Antimony (Sb)-Total   |                | <0.020            | <0.020 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Arsenic (As)-Total    |                | 1.23              | 1.16   |           | mg/kg ww | 6.0    | 45    | 24-OCT-08 |
| Barium (Ba)-Total     |                | 0.557             | 0.567  |           | mg/kg ww | 1.7    | 45    | 24-OCT-08 |
| Beryllium (Be)-Total  |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Bismuth (Bi)-Total    |                | <0.060            | <0.060 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Cadmium (Cd)-Total    |                | 0.041             | 0.040  | J         | mg/kg ww | 0.001  | 0.04  | 24-OCT-08 |
| Calcium (Ca)-Total    |                | 12200             | 10800  |           | mg/kg ww | 12     | 45    | 24-OCT-08 |
| Chromium (Cr)-Total   |                | 0.58              | 0.55   | J         | mg/kg ww | 0.03   | 0.8   | 24-OCT-08 |
| Cobalt (Co)-Total     |                | <0.040            | <0.040 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Copper (Cu)-Total     |                | 0.731             | 0.702  |           | mg/kg ww | 4.0    | 45    | 24-OCT-08 |
| Lead (Pb)-Total       |                | <0.040            | <0.040 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Lithium (Li)-Total    |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Magnesium (Mg)-Total  |                | 463               | 443    |           | mg/kg ww | 4.6    | 45    | 24-OCT-08 |
| Manganese (Mn)-Total  |                | 0.891             | 0.813  |           | mg/kg ww | 9.2    | 45    | 24-OCT-08 |
| Molybdenum (Mo)-Total |                | 0.060             | 0.054  | J         | mg/kg ww | 0.006  | 0.08  | 24-OCT-08 |
| Nickel (Ni)-Total     |                | 0.33              | 0.39   | J         | mg/kg ww | 0.06   | 0.8   | 24-OCT-08 |
| Strontium (Sr)-Total  |                | 60.0              | 55.7   |           | mg/kg ww | 7.5    | 45    | 24-OCT-08 |
| Thallium (Tl)-Total   |                | <0.020            | <0.020 | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |
| Tin (Sn)-Total        |                | <0.10             | <0.10  | RPD-NA    | mg/kg ww | N/A    | 45    | 24-OCT-08 |

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| Test                        | Matrix         | Reference         | Result | Qualifier | Units     | RPD    | Limit | Analyzed  |
|-----------------------------|----------------|-------------------|--------|-----------|-----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>        |                | <b>Tissue</b>     |        |           |           |        |       |           |
| <b>Batch</b>                | <b>R746569</b> |                   |        |           |           |        |       |           |
| <b>WG858192-5</b>           | <b>DUP</b>     | <b>L677662-50</b> |        |           |           |        |       |           |
| Uranium (U)-Total           |                | 0.0072            | 0.0065 | J         | mg/kg wwt | 0.0007 | 0.016 | 24-OCT-08 |
| Vanadium (V)-Total          |                | <0.20             | <0.20  | RPD-NA    | mg/kg wwt | N/A    | 45    | 24-OCT-08 |
| Zinc (Zn)-Total             |                | 20.4              | 19.6   |           | mg/kg wwt | 4.2    | 45    | 24-OCT-08 |
| <b>MOISTURE-TISS-VA</b>     |                | <b>Tissue</b>     |        |           |           |        |       |           |
| <b>Batch</b>                | <b>R745155</b> |                   |        |           |           |        |       |           |
| <b>WG857486-1</b>           | <b>DUP</b>     | <b>L677662-28</b> |        |           |           |        |       |           |
| % Moisture                  |                | 74.9              | 74.6   |           | %         | 0.43   | 30    | 22-OCT-08 |
| <b>WG857486-2</b>           | <b>DUP</b>     | <b>L677662-50</b> |        |           |           |        |       |           |
| % Moisture                  |                | 73.5              | 73.3   |           | %         | 0.32   | 30    | 22-OCT-08 |
| <b>OCP1-TDRY-SOX-ECD-VA</b> |                | <b>Tissue</b>     |        |           |           |        |       |           |
| <b>Batch</b>                | <b>R751284</b> |                   |        |           |           |        |       |           |
| <b>WG858587-3</b>           | <b>DUP</b>     | <b>L677662-48</b> |        |           |           |        |       |           |
| alpha-BHC                   |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Lindane (gamma - BHC)       |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| beta-BHC                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| delta-BHC                   |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Heptachlor                  |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Aldrin                      |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Oxychlordane                |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 2,4'-DDE                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Heptachlor Epoxide          |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| trans-Chlordane (gamma)     |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| trans-Nonachlor             |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| cis-Chlordane (alpha)       |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 4,4'-DDE                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Endosulfan I                |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 2,4'-DDD                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Dieldrin                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 2,4'-DDT                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Endrin                      |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| cis-Nonachlor               |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 4,4'-DDD                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| Endosulfan II               |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |
| 4,4'-DDT                    |                | <1.0              | <1.0   | RPD-NA    | mg/kg     | N/A    | 39    | 06-NOV-08 |

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| Test                               | Matrix         | Reference         | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-------------------|--------|-----------|----------|-----|-------|-----------|
| <b>OCP1-TDRY-SOX-ECD-VA Tissue</b> |                |                   |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                   |        |           |          |     |       |           |
| <b>WG858587-3</b>                  | <b>DUP</b>     | <b>L677662-48</b> |        |           |          |     |       |           |
| Methoxychlor                       |                | <1.0              | <1.0   | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| Mirex                              |                | <1.0              | <1.0   | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| Endosulfan Sulfate                 |                | <1.0              | <1.0   | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| <b>WG858587-1</b>                  | <b>MB</b>      |                   |        |           |          |     |       |           |
| alpha-BHC                          |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Lindane (gamma - BHC)              |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| beta-BHC                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| delta-BHC                          |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Heptachlor                         |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Aldrin                             |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Oxychlordane                       |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 2,4'-DDE                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Heptachlor Epoxide                 |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| trans-Chlordane (gamma)            |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| trans-Nonachlor                    |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| cis-Chlordane (alpha)              |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 4,4'-DDE                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Endosulfan I                       |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 2,4'-DDD                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Dieldrin                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 2,4'-DDT                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Endrin                             |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| cis-Nonachlor                      |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 4,4'-DDD                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Endosulfan II                      |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| 4,4'-DDT                           |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Methoxychlor                       |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Mirex                              |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| Endosulfan Sulfate                 |                |                   | <0.050 |           | mg/kg    |     | 0.05  | 06-NOV-08 |
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                   |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                   |        |           |          |     |       |           |
| <b>WG858587-3</b>                  | <b>DUP</b>     | <b>L677662-48</b> |        |           |          |     |       |           |
| alpha-BHC                          |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Lindane (gamma - BHC)              |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |

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| Test                               | Matrix         | Reference         | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-------------------|--------|-----------|----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                   |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                   |        |           |          |     |       |           |
| <b>WG858587-3</b>                  | <b>DUP</b>     | <b>L677662-48</b> |        |           |          |     |       |           |
| beta-BHC                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| delta-BHC                          |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Heptachlor                         |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Aldrin                             |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Oxychlordane                       |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 2,4'-DDE                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Heptachlor Epoxide                 |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| trans-Chlordane (gamma)            |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| trans-Nonachlor                    |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| cis-Chlordane (alpha)              |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 4,4'-DDE                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Endosulfan I                       |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 2,4'-DDD                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Dieldrin                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 2,4'-DDT                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Endrin                             |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| cis-Nonachlor                      |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 4,4'-DDD                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Endosulfan II                      |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| 4,4'-DDT                           |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Methoxychlor                       |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Mirex                              |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Endosulfan Sulfate                 |                | <0.20             | <0.20  | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| <b>WG858587-1</b>                  | <b>MB</b>      |                   |        |           |          |     |       |           |
| alpha-BHC                          |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Lindane (gamma - BHC)              |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| beta-BHC                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| delta-BHC                          |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Heptachlor                         |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Aldrin                             |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Oxychlordane                       |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 2,4'-DDE                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Heptachlor Epoxide                 |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| trans-Chlordane (gamma)            |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |

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| Test                               | Matrix         | Reference         | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-------------------|--------|-----------|----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                   |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                   |        |           |          |     |       |           |
| <b>WG858587-1 MB</b>               |                |                   |        |           |          |     |       |           |
| trans-Nonachlor                    |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| cis-Chlordane (alpha)              |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 4,4'-DDE                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endosulfan I                       |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 2,4'-DDD                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Dieldrin                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 2,4'-DDT                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endrin                             |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| cis-Nonachlor                      |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 4,4'-DDD                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endosulfan II                      |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 4,4'-DDT                           |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Methoxychlor                       |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Mirex                              |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endosulfan Sulfate                 |                |                   | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |                |                   |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                   |        |           |          |     |       |           |
| <b>WG858587-3 DUP</b>              |                | <b>L677662-48</b> |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |                | 0.28              | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1016                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1221                           |                | <0.25             | <0.20  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1232                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1242                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1248                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1254                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1260                           |                | 0.28              | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1262                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| PCB-1268                           |                | <0.25             | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 06-NOV-08 |
| <b>WG858587-1 MB</b>               |                |                   |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |                |                   | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1016                           |                |                   | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1221                           |                |                   | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1232                           |                |                   | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1242                           |                |                   | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |

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| Test                               | Matrix  | Reference  | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|---------|------------|--------|-----------|----------|-----|-------|-----------|
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |         |            |        |           |          |     |       |           |
| Batch                              | R751284 |            |        |           |          |     |       |           |
| WG858587-1                         | MB      |            |        |           |          |     |       |           |
| PCB-1248                           |         |            | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1254                           |         |            | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1260                           |         |            | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1262                           |         |            | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| PCB-1268                           |         |            | <0.25  |           | mg/kg    |     | 0.25  | 06-NOV-08 |
| <b>PCB-T-WET-SOX-ECD-VA Tissue</b> |         |            |        |           |          |     |       |           |
| Batch                              | R751284 |            |        |           |          |     |       |           |
| WG858587-3                         | DUP     | L677662-48 |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |         | 0.078      | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1016                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1221                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1232                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1242                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1248                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1254                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1260                           |         | 0.078      | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1262                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| PCB-1268                           |         | <0.050     | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| WG858587-1                         | MB      |            |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1016                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1221                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1232                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1242                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1248                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1254                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1260                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1262                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| PCB-1268                           |         |            | <0.050 |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| <b>SE-DRY-HVAAS-VA Tissue</b>      |         |            |        |           |          |     |       |           |
| Batch                              | R745058 |            |        |           |          |     |       |           |
| WG856600-3                         | DUP     | L677662-8  |        |           |          |     |       |           |
| Selenium (Se)-Total                |         | 2.42       | 2.59   |           | mg/kg    | 6.8 | 45    | 22-OCT-08 |
| WG856600-4                         | DUP     | L677662-23 |        |           |          |     |       |           |

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| Test                   | Matrix         | Reference           | Result | Qualifier | Units     | RPD  | Limit  | Analyzed  |
|------------------------|----------------|---------------------|--------|-----------|-----------|------|--------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |      |        |           |
| <b>Batch</b>           | <b>R745058</b> |                     |        |           |           |      |        |           |
| <b>WG856600-4</b>      | <b>DUP</b>     | <b>L677662-23</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 1.92                | 1.92   |           | mg/kg     | 0.12 | 45     | 22-OCT-08 |
| <b>WG856600-1</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |      | 0.1    | 22-OCT-08 |
| <b>WG856600-2</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |      | 0.1    | 22-OCT-08 |
| <b>Batch</b>           | <b>R747392</b> |                     |        |           |           |      |        |           |
| <b>WG858192-7</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | 95     |           | %         |      | 83-112 | 27-OCT-08 |
| <b>WG858192-3</b>      | <b>DUP</b>     | <b>L677662-34</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 1.52                | 1.54   |           | mg/kg     | 1.4  | 45     | 27-OCT-08 |
| <b>WG858192-5</b>      | <b>DUP</b>     | <b>L677662-50</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 3.73                | 4.25   |           | mg/kg     | 13   | 45     | 27-OCT-08 |
| <b>WG858192-1</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |      | 0.1    | 27-OCT-08 |
| <b>WG858192-2</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |      | 0.1    | 27-OCT-08 |
| <b>SE-WET-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |      |        |           |
| <b>Batch</b>           | <b>R747488</b> |                     |        |           |           |      |        |           |
| <b>WG858192-7</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | 95     |           | %         |      | 83-112 | 27-OCT-08 |
| <b>WG856600-3</b>      | <b>DUP</b>     | <b>L677662-8</b>    |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 0.633               | 0.677  |           | mg/kg wwt | 6.8  | 45     | 27-OCT-08 |
| <b>WG856600-4</b>      | <b>DUP</b>     | <b>L677662-23</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 0.436               | 0.437  |           | mg/kg wwt | 0.12 | 45     | 27-OCT-08 |
| <b>WG858192-3</b>      | <b>DUP</b>     | <b>L677662-34</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 0.348               | 0.353  |           | mg/kg wwt | 1.4  | 45     | 27-OCT-08 |
| <b>WG858192-5</b>      | <b>DUP</b>     | <b>L677662-50</b>   |        |           |           |      |        |           |
| Selenium (Se)-Total    |                | 0.989               | 1.13   |           | mg/kg wwt | 13   | 45     | 27-OCT-08 |
| <b>WG856600-1</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |      | 0.02   | 27-OCT-08 |
| <b>WG856600-2</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |      | 0.02   | 27-OCT-08 |
| <b>WG858192-1</b>      | <b>MB</b>      |                     |        |           |           |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |      | 0.02   | 27-OCT-08 |

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| Test                | Matrix  | Reference | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|---------------------|---------|-----------|--------|-----------|-----------|-----|-------|-----------|
| SE-WET-HVAAS-VA     | Tissue  |           |        |           |           |     |       |           |
| Batch               | R749189 |           |        |           |           |     |       |           |
| WG858192-2          | MB      |           |        |           |           |     |       |           |
| Selenium (Se)-Total |         |           | <0.020 |           | mg/kg wwt |     | 0.02  | 30-OCT-08 |



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**Legend:**

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

**Sample Parameter Qualifier Definitions:**

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| Qualifier | Description                                                                                 |
|-----------|---------------------------------------------------------------------------------------------|
| DUP-H     | Duplicate results outside ALS DQO, due to sample heterogeneity.                             |
| J         | Duplicate results and limits are expressed in terms of absolute difference.                 |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit. |

Sample IDSample Date

06385

U677662

|             |                                |             |              |
|-------------|--------------------------------|-------------|--------------|
| Guabina     | 23cm TL W7                     | Mar 17 / 08 |              |
| "           | 22.4cm TL W7                   | Mar 17 / 08 |              |
| "           | 16.1cm TL SJFI                 | Mar 16 / 08 |              |
| Caimito     | 20cm TL -                      | Mar 11 / 08 | "Guabina"    |
| G. dormitor | 14.4cm TL CF1                  | "           |              |
| Guabina     | 15cm TL HF1 <del>(H4/W4)</del> | Mar 13 / 08 | "Hoja"       |
| "           | 15.4cm TL PF1                  | Mar 19 / 08 | "Petaguilla" |
| "           | 25.1cm TL PF1                  | Mar 14 / 08 |              |
| "           | 21.8cm TL H4/W4                | Mar 16 / 08 |              |
| "           | 20.4cm TL H4/W4                | "           |              |
| Caimito     | 13.5cm CF2                     | Mar 11 / 08 | "Guabina"    |
| G. dormitor | 10.2cm TL CF1                  | "           |              |
| Caimito     | 20.2cm TL CF2                  | "           | "Guabina"    |
| G. dormitor | 15.7cm TL RF1                  | Mar 13 / 08 | "Rinconcito" |
| Guabina     | 20.6cm TL PF1                  | Mar 14 / 08 | "Petaguilla" |
| "           | 22.8cm SJFI                    | Mar 16 / 08 |              |
| "           | 16.4cm TL PF1                  | Mar 14 / 08 | "Petaguilla" |
| "           | 17.6cm TL PF1                  | "           |              |
| "           | 19.1cm TL W7                   | Mar 17 / 08 |              |
| "           | 23.4cm TL PF1                  | Mar 14 / 08 | "Petaguilla" |
| "           | 19.7cm PF1                     | "           | "Guabina"    |
| "           | 19.3 TL RF1                    | Mar 13 / 08 | "Rinconcito" |
| "           | 23.0cm TL BFH1                 | Mar 18 / 08 |              |
| "           | 16.1 TL HF1                    | Mar 13 / 08 | "Guabina"    |
| "           | 10.6cm TL CF1                  | Mar 11 / 08 | "Caimito"    |
| "           | - HF1                          | Mar 13 / 08 | "Hoja"       |
| Baca Chica  | 14.6cm TL SJFI                 | Mar 16 / 08 |              |
| "           | 18cm FL CF1                    | Mar 11 / 08 |              |
| "           | 19.9cm TL HF1                  | Mar 13 / 08 | "Hoja"       |
| oricardal   | 9.9cm TL BFH1                  | Mar 18 / 08 |              |
| "           | 13cm TL BFH1                   | "           |              |
| Brycon      | 14.3cm TL SJFI                 | Mar 16 / 08 |              |
| "           | 13.4cm TL BFH1                 | Mar 18 / 08 |              |

|               |           |        |           |              |
|---------------|-----------|--------|-----------|--------------|
| Brycon        | 14.8cm TL | RFI    | Mar 13/08 | "Rinconcito" |
| "             | 11.7cm TL | MF1    | Mar 18/08 |              |
| "             | 13.3cm TL | SJF1   | Mar 16/08 |              |
| "             | 15.5cm TL | MF1    | Mar 18/08 |              |
| "             | 14.8cm TL | BFH1   | "         |              |
| "             | 13.7cm TL | BFH1   | "         |              |
| "             | 16.3cm TL | MF1    | "         |              |
| "             | 17.6cm    | MF1    | "         |              |
| "             | 16.3cm TL | BFH1   | "         |              |
| "             | 16cm TL   | MF1    | "         |              |
| "             | 14cm TL   | MF1    | "         |              |
| "             | 13.2cm TL | H4/W4  | Mar 16/08 |              |
| "             | 16cm TL   | MF1    | Mar 18/08 |              |
| "             | 17.2cm TL | RFI    | Mar 13/08 |              |
| Caranx latu   | 32.1cm FL | 620.0g | Mar 10/08 | "Carmito"    |
| Caranx latu   | 21.6cm FL | CF1    | Mar 11/08 | "Carmito"    |
| Caranx crisis | 27.5cm    | 349.0g | Mar 10/08 | "Carmito"    |
| "             | 30.0cm    | 449.3g | "         | "Carmito"    |



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
ATTN: ADRIAN DE BRUYN  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Reported On: 07-NOV-08 06:11 PM  
Revision: 1

Lab Work Order #: **L680075**

Date Received: **20-MAR-08**

Project P.O. #:  
Job Reference: MARINE PANAMA FISH  
Legal Site Desc:  
CofC Numbers:

Other Information:

**Comments:** All samples were digested as whole-body except for samples L680075-1, -2 and -3 in which case a number of muscle tissue portions were taken from the samples and homogenized in order to produce a representative sample for each stingray.

GLENYSS WEEKS  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                  | L680075-1 | L680075-2 | L680075-3 | L680075-4 | L680075-5 |
|-----------------------------------------------------------------------|----------------------------------|-----------|-----------|-----------|-----------|-----------|
|                                                                       |                                  | RAY 1     | RAY 2     | RAY 3     | FISH 1    | FISH 2    |
| Grouping                                                              | Analyte                          |           |           |           |           |           |
| <b>TISSUE</b>                                                         |                                  |           |           |           |           |           |
| <b>Physical Tests</b>                                                 | % Moisture (%)                   | 78.3      | 71.4      | 76.8      | 65.5      | 61.9      |
| <b>Metals</b>                                                         | Aluminum (Al)-Total (mg/kg)      | 15        | 19        | 13        | 71        | 40        |
|                                                                       | Aluminum (Al)-Total (mg/kg ww)   | 3.3       | 5.5       | 3.0       | 24.4      | 15.1      |
|                                                                       | Antimony (Sb)-Total (mg/kg)      | <0.050    | <0.050    | <0.050    | <0.20     | <0.10     |
|                                                                       | Antimony (Sb)-Total (mg/kg ww)   | <0.010    | <0.010    | <0.010    | <0.040    | <0.020    |
|                                                                       | Arsenic (As)-Total (mg/kg)       | 20.1      | 27.1      | 37.8      | 7.92      | 7.23      |
|                                                                       | Arsenic (As)-Total (mg/kg ww)    | 4.37      | 7.77      | 8.78      | 2.73      | 2.75      |
|                                                                       | Barium (Ba)-Total (mg/kg)        | 0.194     | 1.28      | 0.546     | 6.85      | 8.16      |
|                                                                       | Barium (Ba)-Total (mg/kg ww)     | 0.042     | 0.367     | 0.127     | 2.36      | 3.11      |
|                                                                       | Beryllium (Be)-Total (mg/kg)     | <0.30     | <0.30     | <0.30     | <1.2      | <0.60     |
|                                                                       | Beryllium (Be)-Total (mg/kg ww)  | <0.10     | <0.10     | <0.10     | <0.40     | <0.20     |
|                                                                       | Bismuth (Bi)-Total (mg/kg)       | <0.30     | <0.30     | <0.30     | <1.2      | <0.60     |
|                                                                       | Bismuth (Bi)-Total (mg/kg ww)    | <0.030    | <0.030    | <0.030    | <0.12     | <0.060    |
|                                                                       | Cadmium (Cd)-Total (mg/kg)       | <0.030    | <0.030    | <0.030    | <0.12     | 0.078     |
|                                                                       | Cadmium (Cd)-Total (mg/kg ww)    | <0.0050   | <0.0050   | <0.0050   | 0.039     | 0.030     |
|                                                                       | Calcium (Ca)-Total (mg/kg)       | 470       | 6330      | 656       | 74000     | 50100     |
|                                                                       | Calcium (Ca)-Total (mg/kg ww)    | 102       | 1810      | 152       | 25500     | 19100     |
|                                                                       | Chromium (Cr)-Total (mg/kg)      | 0.79      | 1.71      | 0.89      | <2.0      | 3.4       |
|                                                                       | Chromium (Cr)-Total (mg/kg ww)   | 0.17      | 0.49      | 0.21      | 0.47      | 1.30      |
|                                                                       | Cobalt (Co)-Total (mg/kg)        | <0.10     | <0.10     | <0.10     | <0.40     | <0.20     |
|                                                                       | Cobalt (Co)-Total (mg/kg ww)     | <0.020    | <0.020    | <0.020    | <0.080    | <0.040    |
|                                                                       | Copper (Cu)-Total (mg/kg)        | 0.814     | 1.50      | 0.968     | 2.18      | 2.05      |
|                                                                       | Copper (Cu)-Total (mg/kg ww)     | 0.177     | 0.430     | 0.225     | 0.752     | 0.783     |
|                                                                       | Lead (Pb)-Total (mg/kg)          | <0.10     | <0.10     | 0.16      | <0.40     | <0.20     |
|                                                                       | Lead (Pb)-Total (mg/kg ww)       | <0.020    | <0.020    | 0.036     | <0.080    | <0.040    |
|                                                                       | Lithium (Li)-Total (mg/kg)       | <0.50     | <0.50     | <0.50     | <2.0      | <1.0      |
|                                                                       | Lithium (Li)-Total (mg/kg ww)    | <0.10     | <0.10     | <0.10     | <0.40     | <0.20     |
|                                                                       | Magnesium (Mg)-Total (mg/kg)     | 1130      | 903       | 943       | 1880      | 1520      |
|                                                                       | Magnesium (Mg)-Total (mg/kg ww)  | 246       | 258       | 219       | 649       | 580       |
|                                                                       | Manganese (Mn)-Total (mg/kg)     | 0.536     | 2.16      | 0.705     | 25.8      | 24.6      |
|                                                                       | Manganese (Mn)-Total (mg/kg ww)  | 0.116     | 0.618     | 0.164     | 8.90      | 9.38      |
|                                                                       | Mercury (Hg)-Total (mg/kg)       | 1.70      | 0.219     | 0.158     | 0.523     | 0.309     |
|                                                                       | Mercury (Hg)-Total (mg/kg ww)    | 0.370     | 0.0627    | 0.0366    | 0.181     | 0.118     |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)    | 0.058     | 0.133     | 0.072     | <0.20     | <0.10     |
|                                                                       | Molybdenum (Mo)-Total (mg/kg ww) | 0.013     | 0.038     | 0.017     | <0.040    | 0.020     |
|                                                                       | Nickel (Ni)-Total (mg/kg)        | <0.50     | 1.02      | 0.52      | <2.0      | 1.7       |
|                                                                       | Nickel (Ni)-Total (mg/kg ww)     | <0.10     | 0.29      | 0.12      | <0.40     | 0.65      |
|                                                                       | Selenium (Se)-Total (mg/kg)      | 1.57      | 1.9       | 1.62      | 1.49      | 1.52      |
|                                                                       | Selenium (Se)-Total (mg/kg ww)   | 0.341     | 0.54      | 0.375     | 0.513     | 0.577     |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L680075-6 | L680075-7 | L680075-8 | L680075-9 | L680075-10 |
|-----------------------------------------------------------------------|-----------------------------------|-----------|-----------|-----------|-----------|------------|
| Grouping Analyte                                                      |                                   | FISH 3    | FISH 4    | FISH 5    | FISH 6    | FISH 7     |
| <b>TISSUE</b>                                                         |                                   |           |           |           |           |            |
| <b>Physical Tests</b>                                                 | % Moisture (%)                    | 54.8      | 68.2      | 54.4      | 67.0      | 59.9       |
| <b>Metals</b>                                                         | Aluminum (Al)-Total (mg/kg)       | <10       | 141       | <20       | 256       | 132        |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 4.4       | 45.0      | 7.7       | 84.6      | 53.1       |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050    | <0.10     | <0.10     | <0.10     | <0.15      |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010    | <0.020    | <0.020    | <0.020    | <0.030     |
|                                                                       | Arsenic (As)-Total (mg/kg)        | 1.49      | 9.69      | 1.37      | 5.29      | 4.85       |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | 0.671     | 3.08      | 0.624     | 1.75      | 1.95       |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 5.65      | 2.70      | 4.11      | 2.28      | 7.62       |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 2.55      | 0.860     | 1.87      | 0.752     | 3.06       |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30     | <0.60     | <0.60     | <0.60     | <0.90      |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10     | <0.20     | <0.20     | <0.20     | <0.30      |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30     | <0.60     | <0.60     | <0.60     | <0.90      |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030    | <0.060    | <0.060    | <0.060    | <0.090     |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | <0.030    | <0.060    | <0.060    | <0.060    | <0.090     |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0113    | <0.010    | 0.012     | 0.014     | 0.016      |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 43500     | 51000     | 28700     | 46400     | 59000      |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 19600     | 16200     | 13100     | 15300     | 23700      |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 0.57      | <1.0      | <1.0      | 3.0       | 3.2        |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.26      | 0.29      | 0.21      | 0.98      | 1.27       |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10     | <0.20     | <0.20     | <0.20     | <0.30      |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020    | <0.040    | 0.069     | <0.040    | <0.060     |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 0.792     | 7.35      | 0.95      | 1.76      | 1.49       |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.358     | 2.34      | 0.433     | 0.582     | 0.599      |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10     | <0.20     | <0.20     | <0.20     | <0.30      |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020    | <0.040    | <0.040    | 0.045     | <0.060     |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50     | <1.0      | <1.0      | <1.0      | <1.5       |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10     | <0.20     | <0.20     | <0.20     | <0.30      |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 976       | 1640      | 993       | 1610      | 1560       |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 441       | 521       | 453       | 531       | 625        |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 22.0      | 11.8      | 12.5      | 43.3      | 15.8       |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 9.92      | 3.76      | 5.71      | 14.3      | 6.32       |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.059     | 0.304     | 0.111     | 0.187     | 0.319      |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0267    | 0.0966    | 0.0506    | 0.0617    | 0.128      |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.073     | 0.13      | <0.10     | <0.10     | <0.15      |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.033     | 0.042     | 0.024     | <0.020    | <0.030     |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <0.50     | <1.0      | <1.0      | 1.3       | <1.5       |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.21      | <0.20     | <0.20     | 0.43      | 0.54       |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 1.19      | 3.31      | 1.41      | 1.35      | 1.17       |
|                                                                       | Selenium (Se)-Total (mg/kg wwt)   | 0.538     | 1.05      | 0.644     | 0.444     | 0.470      |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                  | L680075-11 | L680075-12 | L680075-13              | L680075-14              | L680075-15              |
|-----------------------------------------------------------------------|----------------------------------|------------|------------|-------------------------|-------------------------|-------------------------|
|                                                                       |                                  | FISH 8     | FISH 9     | DIAPTERUS<br>PLUMIEN #1 | DIAPTERUS<br>PLUMIEN #2 | DIAPTERUS<br>PLUMIEN #3 |
| Grouping                                                              | Analyte                          |            |            |                         |                         |                         |
| <b>TISSUE</b>                                                         |                                  |            |            |                         |                         |                         |
| Physical Tests                                                        | % Moisture (%)                   | 63.1       | 66.7       | 69.4                    | 62.1                    | 70.4                    |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)      | 63         | 48         | 125                     | 126                     | 130                     |
|                                                                       | Aluminum (Al)-Total (mg/kg ww)   | 23.1       | 15.8       | 38.4                    | 47.6                    | 38.5                    |
|                                                                       | Antimony (Sb)-Total (mg/kg)      | <0.10      | <0.15      | <0.15                   | <0.15                   | <0.15                   |
|                                                                       | Antimony (Sb)-Total (mg/kg ww)   | <0.020     | <0.030     | <0.030                  | <0.030                  | <0.030                  |
|                                                                       | Arsenic (As)-Total (mg/kg)       | 6.37       | 10.1       | 8.28                    | 0.87                    | 4.89                    |
|                                                                       | Arsenic (As)-Total (mg/kg ww)    | 2.35       | 3.36       | 2.53                    | 0.330                   | 1.45                    |
|                                                                       | Barium (Ba)-Total (mg/kg)        | 6.30       | 6.16       | 8.50                    | 5.69                    | 11.5                    |
|                                                                       | Barium (Ba)-Total (mg/kg ww)     | 2.32       | 2.05       | 2.60                    | 2.16                    | 3.40                    |
|                                                                       | Beryllium (Be)-Total (mg/kg)     | <0.60      | <0.90      | <0.90                   | <0.90                   | <0.90                   |
|                                                                       | Beryllium (Be)-Total (mg/kg ww)  | <0.20      | <0.30      | <0.30                   | <0.30                   | <0.30                   |
|                                                                       | Bismuth (Bi)-Total (mg/kg)       | <0.60      | <0.90      | <0.90                   | <0.90                   | <0.90                   |
|                                                                       | Bismuth (Bi)-Total (mg/kg ww)    | <0.060     | <0.090     | <0.090                  | <0.090                  | <0.090                  |
|                                                                       | Cadmium (Cd)-Total (mg/kg)       | 0.068      | <0.090     | <0.090                  | <0.090                  | <0.090                  |
|                                                                       | Cadmium (Cd)-Total (mg/kg ww)    | 0.025      | 0.017      | <0.015                  | <0.015                  | <0.015                  |
|                                                                       | Calcium (Ca)-Total (mg/kg)       | 54000      | 70400      | 85900                   | 65300                   | 74800                   |
|                                                                       | Calcium (Ca)-Total (mg/kg ww)    | 19900      | 23400      | 26300                   | 24700                   | 22200                   |
|                                                                       | Chromium (Cr)-Total (mg/kg)      | <1.0       | <1.5       | <1.5                    | <1.5                    | 1.5                     |
|                                                                       | Chromium (Cr)-Total (mg/kg ww)   | 0.28       | 0.37       | 0.38                    | <0.30                   | 0.45                    |
|                                                                       | Cobalt (Co)-Total (mg/kg)        | <0.20      | <0.30      | <0.30                   | <0.30                   | <0.30                   |
|                                                                       | Cobalt (Co)-Total (mg/kg ww)     | <0.040     | <0.060     | <0.060                  | <0.060                  | <0.060                  |
|                                                                       | Copper (Cu)-Total (mg/kg)        | 1.75       | 1.49       | 2.15                    | 2.22                    | 1.65                    |
|                                                                       | Copper (Cu)-Total (mg/kg ww)     | 0.647      | 0.496      | 0.657                   | 0.841                   | 0.488                   |
|                                                                       | Lead (Pb)-Total (mg/kg)          | 0.61       | <0.30      | <0.30                   | <0.30                   | <0.30                   |
|                                                                       | Lead (Pb)-Total (mg/kg ww)       | 0.226      | <0.060     | <0.060                  | <0.060                  | <0.060                  |
|                                                                       | Lithium (Li)-Total (mg/kg)       | <1.0       | <1.5       | <1.5                    | <1.5                    | <1.5                    |
|                                                                       | Lithium (Li)-Total (mg/kg ww)    | <0.20      | <0.30      | <0.30                   | <0.30                   | <0.30                   |
|                                                                       | Magnesium (Mg)-Total (mg/kg)     | 1510       | 1860       | 2160                    | 1630                    | 2200                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg ww)  | 558        | 621        | 660                     | 617                     | 651                     |
|                                                                       | Manganese (Mn)-Total (mg/kg)     | 17.9       | 20.0       | 32.0                    | 41.8                    | 33.3                    |
|                                                                       | Manganese (Mn)-Total (mg/kg ww)  | 6.59       | 6.66       | 9.80                    | 15.9                    | 9.85                    |
|                                                                       | Mercury (Hg)-Total (mg/kg)       | 0.372      | 0.209      | 0.323                   | 0.103                   | 0.288                   |
|                                                                       | Mercury (Hg)-Total (mg/kg ww)    | 0.137      | 0.0695     | 0.0989                  | 0.0389                  | 0.0852                  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)    | 0.11       | <0.15      | <0.15                   | <0.15                   | 0.18                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg ww) | 0.040      | 0.039      | 0.040                   | <0.030                  | 0.053                   |
|                                                                       | Nickel (Ni)-Total (mg/kg)        | <1.0       | <1.5       | <1.5                    | <1.5                    | <1.5                    |
|                                                                       | Nickel (Ni)-Total (mg/kg ww)     | <0.20      | <0.30      | <0.30                   | <0.30                   | <0.30                   |
|                                                                       | Selenium (Se)-Total (mg/kg)      | 1.75       | 1.51       | 1.61                    | 0.97                    | 1.66                    |
|                                                                       | Selenium (Se)-Total (mg/kg ww)   | 0.646      | 0.503      | 0.494                   | 0.366                   | 0.492                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                | L680075-16              | L680075-17              | L680075-18              | L680075-19              | L680075-20              |
|-----------------------------------------------------------------------|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Grouping                                                              |                | DIAPTERUS<br>PLUMIEN #4 | DIAPTERUS<br>PLUMIEN #5 | DIAPTERUS<br>PLUMIEN #6 | DIAPTERUS<br>PLUMIEN #7 | DIAPTERUS<br>PLUMIEN #8 |
| Analyte                                                               |                |                         |                         |                         |                         |                         |
| TISSUE                                                                |                |                         |                         |                         |                         |                         |
| Physical Tests                                                        | % Moisture (%) | 60.3                    | 67.2                    | 54.8                    | 67.1                    | 69.1                    |
| Metals                                                                |                |                         |                         |                         |                         |                         |
| Aluminum (Al)-Total (mg/kg)                                           |                | <20                     | <30                     | <200                    | <30                     | 31                      |
| Aluminum (Al)-Total (mg/kg ww)                                        |                | 7.2                     | <6.0                    | <40                     | <6.0                    | 9.6                     |
| Antimony (Sb)-Total (mg/kg)                                           |                | <0.10                   | <0.15                   | <1.0                    | <0.15                   | <0.15                   |
| Antimony (Sb)-Total (mg/kg ww)                                        |                | <0.020                  | <0.030                  | <0.20                   | <0.030                  | <0.030                  |
| Arsenic (As)-Total (mg/kg)                                            |                | 2.42                    | 0.69                    | 1.5                     | 2.83                    | 4.83                    |
| Arsenic (As)-Total (mg/kg ww)                                         |                | 0.960                   | 0.225                   | 0.68                    | 0.933                   | 1.49                    |
| Barium (Ba)-Total (mg/kg)                                             |                | 8.53                    | 2.16                    | 5.9                     | 13.6                    | 11.7                    |
| Barium (Ba)-Total (mg/kg ww)                                          |                | 3.39                    | 0.708                   | 2.68                    | 4.48                    | 3.62                    |
| Beryllium (Be)-Total (mg/kg)                                          |                | <0.60                   | <0.90                   | <6.0                    | <0.90                   | <0.90                   |
| Beryllium (Be)-Total (mg/kg ww)                                       |                | <0.20                   | <0.30                   | <2.0                    | <0.30                   | <0.30                   |
| Bismuth (Bi)-Total (mg/kg)                                            |                | <0.60                   | <0.90                   | <6.0                    | <0.90                   | <0.90                   |
| Bismuth (Bi)-Total (mg/kg ww)                                         |                | <0.060                  | <0.090                  | <0.60                   | <0.090                  | <0.090                  |
| Cadmium (Cd)-Total (mg/kg)                                            |                | <0.060                  | <0.090                  | <0.60                   | <0.090                  | <0.090                  |
| Cadmium (Cd)-Total (mg/kg ww)                                         |                | <0.010                  | <0.015                  | <0.10                   | <0.015                  | <0.015                  |
| Calcium (Ca)-Total (mg/kg)                                            |                | 50000                   | 71500                   | 48800                   | 74200                   | 75100                   |
| Calcium (Ca)-Total (mg/kg ww)                                         |                | 19800                   | 23500                   | 22000                   | 24400                   | 23200                   |
| Chromium (Cr)-Total (mg/kg)                                           |                | <1.0                    | <1.5                    | <10                     | <1.5                    | <1.5                    |
| Chromium (Cr)-Total (mg/kg ww)                                        |                | 0.25                    | <0.30                   | <2.0                    | <0.30                   | 0.40                    |
| Cobalt (Co)-Total (mg/kg)                                             |                | <0.20                   | <0.30                   | <2.0                    | <0.30                   | <0.30                   |
| Cobalt (Co)-Total (mg/kg ww)                                          |                | <0.040                  | <0.060                  | <0.40                   | <0.060                  | <0.060                  |
| Copper (Cu)-Total (mg/kg)                                             |                | 1.05                    | 1.11                    | <1.0                    | 1.29                    | 1.41                    |
| Copper (Cu)-Total (mg/kg ww)                                          |                | 0.417                   | 0.364                   | 0.44                    | 0.424                   | 0.437                   |
| Lead (Pb)-Total (mg/kg)                                               |                | <0.20                   | <0.30                   | <2.0                    | <0.30                   | <0.30                   |
| Lead (Pb)-Total (mg/kg ww)                                            |                | <0.040                  | <0.060                  | <0.40                   | <0.060                  | <0.060                  |
| Lithium (Li)-Total (mg/kg)                                            |                | <1.0                    | <1.5                    | <10                     | <1.5                    | <1.5                    |
| Lithium (Li)-Total (mg/kg ww)                                         |                | <0.20                   | <0.30                   | <2.0                    | <0.30                   | <0.30                   |
| Magnesium (Mg)-Total (mg/kg)                                          |                | 1440                    | 1880                    | 1250                    | 1930                    | 1950                    |
| Magnesium (Mg)-Total (mg/kg ww)                                       |                | 570                     | 616                     | 565                     | 635                     | 603                     |
| Manganese (Mn)-Total (mg/kg)                                          |                | 30.0                    | 7.09                    | 22.6                    | 34.5                    | 33.1                    |
| Manganese (Mn)-Total (mg/kg ww)                                       |                | 11.9                    | 2.33                    | 10.2                    | 11.3                    | 10.2                    |
| Mercury (Hg)-Total (mg/kg)                                            |                | 0.120                   | 0.036                   | 0.059                   | 0.209                   | 0.373                   |
| Mercury (Hg)-Total (mg/kg ww)                                         |                | 0.0478                  | 0.0119                  | 0.0267                  | 0.0688                  | 0.115                   |
| Molybdenum (Mo)-Total (mg/kg)                                         |                | <0.10                   | <0.15                   | <1.0                    | <0.15                   | <0.15                   |
| Molybdenum (Mo)-Total (mg/kg ww)                                      |                | 0.024                   | <0.030                  | <0.20                   | <0.030                  | 0.046                   |
| Nickel (Ni)-Total (mg/kg)                                             |                | <1.0                    | <1.5                    | <10                     | <1.5                    | <1.5                    |
| Nickel (Ni)-Total (mg/kg ww)                                          |                | <0.20                   | <0.30                   | <2.0                    | <0.30                   | <0.30                   |
| Selenium (Se)-Total (mg/kg)                                           |                | 0.97                    | 1.14                    | 1.09                    | 1.38                    | 1.88                    |
| Selenium (Se)-Total (mg/kg ww)                                        |                | 0.385                   | 0.373                   | 0.493                   | 0.453                   | 0.581                   |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID            |                       |  |  |
|----------------|-----------------------------------|----------------------|-----------------------|--|--|
|                |                                   | Description          |                       |  |  |
|                |                                   | Sampled Date         |                       |  |  |
|                |                                   | Sampled Time         |                       |  |  |
|                |                                   | Client ID            |                       |  |  |
| Grouping       | Analyte                           |                      |                       |  |  |
| TISSUE         |                                   | L680075-21           | L680075-22            |  |  |
| Physical Tests | % Moisture (%)                    | 12-NOV-07            | 12-NOV-07             |  |  |
| Metals         |                                   | DIAPTERUS PLUMIEN #9 | DIAPTERUS PLUMIEN #10 |  |  |
|                | Aluminum (Al)-Total (mg/kg)       | 72.8                 | 69.9                  |  |  |
|                | Aluminum (Al)-Total (mg/kg wwt)   | 106                  | 29                    |  |  |
|                | Antimony (Sb)-Total (mg/kg)       | 28.8                 | 8.6                   |  |  |
|                | Antimony (Sb)-Total (mg/kg wwt)   | <0.10                | <0.10                 |  |  |
|                | Arsenic (As)-Total (mg/kg)        | <0.020               | <0.020                |  |  |
|                | Arsenic (As)-Total (mg/kg wwt)    | 1.18                 | 3.38                  |  |  |
|                | Barium (Ba)-Total (mg/kg)         | 0.320                | 1.02                  |  |  |
|                | Barium (Ba)-Total (mg/kg wwt)     | 7.65                 | 10.4                  |  |  |
|                | Beryllium (Be)-Total (mg/kg)      | 2.08                 | 3.13                  |  |  |
|                | Beryllium (Be)-Total (mg/kg wwt)  | <0.60                | <0.60                 |  |  |
|                | Bismuth (Bi)-Total (mg/kg)        | <0.20                | <0.20                 |  |  |
|                | Bismuth (Bi)-Total (mg/kg wwt)    | <0.60                | <0.60                 |  |  |
|                | Cadmium (Cd)-Total (mg/kg)        | <0.060               | <0.060                |  |  |
|                | Cadmium (Cd)-Total (mg/kg wwt)    | <0.010               | 0.016                 |  |  |
|                | Calcium (Ca)-Total (mg/kg)        | 77300                | 77900                 |  |  |
|                | Calcium (Ca)-Total (mg/kg wwt)    | 21000                | 23400                 |  |  |
|                | Chromium (Cr)-Total (mg/kg)       | <1.0                 | 1.1                   |  |  |
|                | Chromium (Cr)-Total (mg/kg wwt)   | 0.22                 | 0.33                  |  |  |
|                | Cobalt (Co)-Total (mg/kg)         | <0.20                | <0.20                 |  |  |
|                | Cobalt (Co)-Total (mg/kg wwt)     | <0.040               | <0.040                |  |  |
|                | Copper (Cu)-Total (mg/kg)         | 2.41                 | 1.43                  |  |  |
|                | Copper (Cu)-Total (mg/kg wwt)     | 0.655                | 0.430                 |  |  |
|                | Lead (Pb)-Total (mg/kg)           | <0.20                | <0.20                 |  |  |
|                | Lead (Pb)-Total (mg/kg wwt)       | <0.040               | <0.040                |  |  |
|                | Lithium (Li)-Total (mg/kg)        | <1.0                 | <1.0                  |  |  |
|                | Lithium (Li)-Total (mg/kg wwt)    | <0.20                | <0.20                 |  |  |
|                | Magnesium (Mg)-Total (mg/kg)      | 2080                 | 2090                  |  |  |
|                | Magnesium (Mg)-Total (mg/kg wwt)  | 564                  | 628                   |  |  |
|                | Manganese (Mn)-Total (mg/kg)      | 21.3                 | 35.3                  |  |  |
|                | Manganese (Mn)-Total (mg/kg wwt)  | 5.78                 | 10.6                  |  |  |
|                | Mercury (Hg)-Total (mg/kg)        | 0.338                | 0.442                 |  |  |
|                | Mercury (Hg)-Total (mg/kg wwt)    | 0.0917               | 0.133                 |  |  |
|                | Molybdenum (Mo)-Total (mg/kg)     | <0.10                | <0.10                 |  |  |
|                | Molybdenum (Mo)-Total (mg/kg wwt) | 0.024                | 0.026                 |  |  |
|                | Nickel (Ni)-Total (mg/kg)         | <1.0                 | <1.0                  |  |  |
|                | Nickel (Ni)-Total (mg/kg wwt)     | <0.20                | <0.20                 |  |  |
|                | Selenium (Se)-Total (mg/kg)       | 2.17                 | 1.69                  |  |  |
|                | Selenium (Se)-Total (mg/kg wwt)   | 0.589                | 0.510                 |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L680075-1 | L680075-2 | L680075-3 | L680075-4 | L680075-5 |
|-----------------------------------------------------------------------|-------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Grouping Analyte                                                      |                                     | RAY 1     | RAY 2     | RAY 3     | FISH 1    | FISH 2    |
| <b>TISSUE</b>                                                         |                                     |           |           |           |           |           |
| <b>Metals</b>                                                         | Strontium (Sr)-Total (mg/kg)        | 1.90      | 46.8      | 4.52      | 263       | 120       |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)    | 0.412     | 13.4      | 1.05      | 90.7      | 45.8      |
|                                                                       | Thallium (Tl)-Total (mg/kg)         | <0.030    | <0.030    | <0.030    | <0.12     | <0.060    |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)     | <0.010    | <0.010    | <0.010    | <0.040    | <0.020    |
|                                                                       | Tin (Sn)-Total (mg/kg)              | <0.20     | <0.20     | <0.20     | <0.80     | <0.40     |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)          | <0.050    | <0.050    | <0.050    | <0.20     | <0.10     |
|                                                                       | Uranium (U)-Total (mg/kg)           | <0.010    | <0.010    | <0.010    | 0.087     | 0.030     |
|                                                                       | Uranium (U)-Total (mg/kg wwt)       | <0.0020   | <0.0020   | <0.0020   | 0.0301    | 0.0114    |
|                                                                       | Vanadium (V)-Total (mg/kg)          | <0.50     | <0.50     | <0.50     | <2.0      | <1.0      |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)      | <0.10     | <0.10     | <0.10     | <0.40     | 0.23      |
|                                                                       | Zinc (Zn)-Total (mg/kg)             | 16.1      | 20.7      | 16.6      | 110       | 78.2      |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)         | 3.50      | 5.92      | 3.85      | 38.0      | 29.8      |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)                | <0.050    |           |           |           | <0.050    |
|                                                                       | Acenaphthene (mg/kg wwt)            | <0.010    |           |           |           | <0.010    |
|                                                                       | Acenaphthylene (mg/kg)              | <0.050    |           |           |           | <0.050    |
|                                                                       | Acenaphthylene (mg/kg wwt)          | <0.010    |           |           |           | <0.010    |
|                                                                       | Anthracene (mg/kg)                  | <0.050    |           |           |           | <0.050    |
|                                                                       | Anthracene (mg/kg wwt)              | <0.010    |           |           |           | <0.010    |
|                                                                       | Benz(a)anthracene (mg/kg)           | <0.050    |           |           |           | <0.050    |
|                                                                       | Benz(a)anthracene (mg/kg wwt)       | <0.010    |           |           |           | <0.010    |
|                                                                       | Benzo(a)pyrene (mg/kg)              | <0.050    |           |           |           | <0.050    |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)          | <0.010    |           |           |           | <0.010    |
|                                                                       | Benzo(b)fluoranthene (mg/kg)        | <0.050    |           |           |           | <0.050    |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)    | <0.010    |           |           |           | <0.010    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)        | <0.050    |           |           |           | <0.050    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)    | <0.010    |           |           |           | <0.015    |
|                                                                       | Benzo(k)fluoranthene (mg/kg)        | <0.050    |           |           |           | <0.050    |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)    | <0.010    |           |           |           | <0.010    |
|                                                                       | Chrysene (mg/kg)                    | <0.050    |           |           |           | <0.050    |
|                                                                       | Chrysene (mg/kg wwt)                | <0.010    |           |           |           | <0.010    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)       | <0.050    |           |           |           | <0.050    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt)   | <0.010    |           |           |           | <0.010    |
|                                                                       | Fluoranthene (mg/kg)                | <0.050    |           |           |           | <0.050    |
|                                                                       | Fluoranthene (mg/kg wwt)            | <0.010    |           |           |           | <0.010    |
|                                                                       | Fluorene (mg/kg)                    | <0.050    |           |           |           | <0.050    |
|                                                                       | Fluorene (mg/kg wwt)                | <0.010    |           |           |           | <0.010    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)     | <0.050    |           |           |           | <0.050    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt) | <0.010    |           |           |           | <0.010    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L680075-6 | L680075-7 | L680075-8 | L680075-9 | L680075-10 |
|-----------------------------------------------------------------------|-------------------------------------|-----------|-----------|-----------|-----------|------------|
| Grouping Analyte                                                      |                                     | FISH 3    | FISH 4    | FISH 5    | FISH 6    | FISH 7     |
| <b>TISSUE</b>                                                         |                                     |           |           |           |           |            |
| <b>Metals</b>                                                         | Strontium (Sr)-Total (mg/kg)        | 49.4      | 254       | 32.9      | 196       | 198        |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)    | 22.3      | 80.9      | 15.0      | 64.6      | 79.4       |
|                                                                       | Thallium (Tl)-Total (mg/kg)         | <0.030    | <0.060    | <0.060    | <0.060    | <0.090     |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)     | <0.010    | <0.020    | <0.020    | <0.020    | <0.030     |
|                                                                       | Tin (Sn)-Total (mg/kg)              | <0.20     | <0.40     | <0.40     | <0.40     | <0.60      |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)          | <0.050    | <0.10     | <0.10     | <0.10     | <0.15      |
|                                                                       | Uranium (U)-Total (mg/kg)           | 0.023     | <0.020    | <0.020    | 0.039     | 0.048      |
|                                                                       | Uranium (U)-Total (mg/kg wwt)       | 0.0104    | 0.0045    | 0.0058    | 0.0128    | 0.0193     |
|                                                                       | Vanadium (V)-Total (mg/kg)          | <0.50     | <1.0      | <1.0      | <1.0      | <1.5       |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)      | 0.14      | 0.21      | <0.20     | 0.29      | <0.30      |
|                                                                       | Zinc (Zn)-Total (mg/kg)             | 61.3      | 39.8      | 62.2      | 66.7      | 81.9       |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)         | 27.7      | 12.7      | 28.4      | 22.0      | 32.9       |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)                |           |           |           |           |            |
|                                                                       | Acenaphthene (mg/kg wwt)            |           |           |           |           |            |
|                                                                       | Acenaphthylene (mg/kg)              |           |           |           |           |            |
|                                                                       | Acenaphthylene (mg/kg wwt)          |           |           |           |           |            |
|                                                                       | Anthracene (mg/kg)                  |           |           |           |           |            |
|                                                                       | Anthracene (mg/kg wwt)              |           |           |           |           |            |
|                                                                       | Benz(a)anthracene (mg/kg)           |           |           |           |           |            |
|                                                                       | Benz(a)anthracene (mg/kg wwt)       |           |           |           |           |            |
|                                                                       | Benzo(a)pyrene (mg/kg)              |           |           |           |           |            |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)          |           |           |           |           |            |
|                                                                       | Benzo(b)fluoranthene (mg/kg)        |           |           |           |           |            |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)    |           |           |           |           |            |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)        |           |           |           |           |            |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)    |           |           |           |           |            |
|                                                                       | Benzo(k)fluoranthene (mg/kg)        |           |           |           |           |            |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)    |           |           |           |           |            |
|                                                                       | Chrysene (mg/kg)                    |           |           |           |           |            |
|                                                                       | Chrysene (mg/kg wwt)                |           |           |           |           |            |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)       |           |           |           |           |            |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt)   |           |           |           |           |            |
|                                                                       | Fluoranthene (mg/kg)                |           |           |           |           |            |
|                                                                       | Fluoranthene (mg/kg wwt)            |           |           |           |           |            |
|                                                                       | Fluorene (mg/kg)                    |           |           |           |           |            |
|                                                                       | Fluorene (mg/kg wwt)                |           |           |           |           |            |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)     |           |           |           |           |            |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt) |           |           |           |           |            |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L680075-11 | L680075-12 | L680075-13              | L680075-14              | L680075-15              |
|-----------------------------------------------------------------------|-------------------------------------|------------|------------|-------------------------|-------------------------|-------------------------|
|                                                                       |                                     | FISH 8     | FISH 9     | DIAPTERUS<br>PLUMIEN #1 | DIAPTERUS<br>PLUMIEN #2 | DIAPTERUS<br>PLUMIEN #3 |
| Grouping                                                              | Analyte                             |            |            |                         |                         |                         |
| <b>TISSUE</b>                                                         |                                     |            |            |                         |                         |                         |
| <b>Metals</b>                                                         | Strontium (Sr)-Total (mg/kg)        | 131        | 198        | 176                     | 278                     | 131                     |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)    | 48.4       | 65.8       | 54.0                    | 105                     | 38.9                    |
|                                                                       | Thallium (Tl)-Total (mg/kg)         | <0.060     | <0.090     | <0.090                  | <0.090                  | <0.090                  |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)     | <0.020     | <0.030     | <0.030                  | <0.030                  | <0.030                  |
|                                                                       | Tin (Sn)-Total (mg/kg)              | <0.40      | <0.60      | <0.60                   | <0.60                   | <0.60                   |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)          | <0.10      | <0.15      | <0.15                   | <0.15                   | <0.15                   |
|                                                                       | Uranium (U)-Total (mg/kg)           | 0.043      | <0.030     | <0.030                  | <0.030                  | 0.034                   |
|                                                                       | Uranium (U)-Total (mg/kg wwt)       | 0.0159     | 0.0079     | 0.0069                  | 0.0066                  | 0.0100                  |
|                                                                       | Vanadium (V)-Total (mg/kg)          | <1.0       | <1.5       | <1.5                    | <1.5                    | <1.5                    |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)      | 0.30       | <0.30      | 0.38                    | <0.30                   | 0.44                    |
|                                                                       | Zinc (Zn)-Total (mg/kg)             | 92.6       | 98.0       | 116                     | 103                     | 112                     |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)         | 34.1       | 32.6       | 35.4                    | 39.1                    | 33.2                    |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)                |            |            |                         |                         |                         |
|                                                                       | Acenaphthene (mg/kg wwt)            |            |            |                         |                         |                         |
|                                                                       | Acenaphthylene (mg/kg)              |            |            |                         |                         |                         |
|                                                                       | Acenaphthylene (mg/kg wwt)          |            |            |                         |                         |                         |
|                                                                       | Anthracene (mg/kg)                  |            |            |                         |                         |                         |
|                                                                       | Anthracene (mg/kg wwt)              |            |            |                         |                         |                         |
|                                                                       | Benz(a)anthracene (mg/kg)           |            |            |                         |                         |                         |
|                                                                       | Benz(a)anthracene (mg/kg wwt)       |            |            |                         |                         |                         |
|                                                                       | Benzo(a)pyrene (mg/kg)              |            |            |                         |                         |                         |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)          |            |            |                         |                         |                         |
|                                                                       | Benzo(b)fluoranthene (mg/kg)        |            |            |                         |                         |                         |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)    |            |            |                         |                         |                         |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)        |            |            |                         |                         |                         |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)    |            |            |                         |                         |                         |
|                                                                       | Benzo(k)fluoranthene (mg/kg)        |            |            |                         |                         |                         |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)    |            |            |                         |                         |                         |
|                                                                       | Chrysene (mg/kg)                    |            |            |                         |                         |                         |
|                                                                       | Chrysene (mg/kg wwt)                |            |            |                         |                         |                         |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)       |            |            |                         |                         |                         |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt)   |            |            |                         |                         |                         |
|                                                                       | Fluoranthene (mg/kg)                |            |            |                         |                         |                         |
|                                                                       | Fluoranthene (mg/kg wwt)            |            |            |                         |                         |                         |
|                                                                       | Fluorene (mg/kg)                    |            |            |                         |                         |                         |
|                                                                       | Fluorene (mg/kg wwt)                |            |            |                         |                         |                         |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)     |            |            |                         |                         |                         |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt) |            |            |                         |                         |                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                     | Sample ID    | L680075-16           | L680075-17           | L680075-18           | L680075-19           | L680075-20           |
|-----------------------------------------|-------------------------------------|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                                         |                                     | Description  |                      |                      |                      |                      |                      |
|                                         |                                     | Sampled Date | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            |
|                                         |                                     | Sampled Time |                      |                      |                      |                      |                      |
|                                         |                                     | Client ID    | DIAPTERUS PLUMIEN #4 | DIAPTERUS PLUMIEN #5 | DIAPTERUS PLUMIEN #6 | DIAPTERUS PLUMIEN #7 | DIAPTERUS PLUMIEN #8 |
| Grouping                                | Analyte                             |              |                      |                      |                      |                      |                      |
| <b>TISSUE</b>                           |                                     |              |                      |                      |                      |                      |                      |
| <b>Metals</b>                           | Strontium (Sr)-Total (mg/kg)        |              | 62.9                 | 289                  | 52.9                 | 156                  | 167                  |
|                                         | Strontium (Sr)-Total (mg/kg wwt)    |              | 25.0                 | 94.7                 | 23.9                 | 51.4                 | 51.8                 |
|                                         | Thallium (Tl)-Total (mg/kg)         |              | <0.060               | <0.090               | <0.60                | <0.090               | <0.090               |
|                                         | Thallium (Tl)-Total (mg/kg wwt)     |              | <0.020               | <0.030               | <0.20                | <0.030               | <0.030               |
|                                         | Tin (Sn)-Total (mg/kg)              |              | <0.40                | <0.60                | <4.0                 | <0.60                | <0.60                |
|                                         | Tin (Sn)-Total (mg/kg wwt)          |              | <0.10                | <0.15                | <1.0                 | <0.15                | <0.15                |
|                                         | Uranium (U)-Total (mg/kg)           |              | <0.020               | <0.030               | <0.20                | <0.030               | <0.030               |
|                                         | Uranium (U)-Total (mg/kg wwt)       |              | 0.0068               | <0.0060              | <0.040               | 0.0071               | <0.0060              |
|                                         | Vanadium (V)-Total (mg/kg)          |              | <1.0                 | <1.5                 | <10                  | <1.5                 | <1.5                 |
|                                         | Vanadium (V)-Total (mg/kg wwt)      |              | 0.30                 | <0.30                | <2.0                 | <0.30                | <0.30                |
|                                         | Zinc (Zn)-Total (mg/kg)             |              | 95.8                 | 103                  | 69                   | 106                  | 118                  |
|                                         | Zinc (Zn)-Total (mg/kg wwt)         |              | 38.0                 | 33.9                 | 31.1                 | 34.8                 | 36.5                 |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Acenaphthene (mg/kg)                |              |                      |                      |                      |                      |                      |
|                                         | Acenaphthene (mg/kg wwt)            |              |                      |                      |                      |                      |                      |
|                                         | Acenaphthylene (mg/kg)              |              |                      |                      |                      |                      |                      |
|                                         | Acenaphthylene (mg/kg wwt)          |              |                      |                      |                      |                      |                      |
|                                         | Anthracene (mg/kg)                  |              |                      |                      |                      |                      |                      |
|                                         | Anthracene (mg/kg wwt)              |              |                      |                      |                      |                      |                      |
|                                         | Benz(a)anthracene (mg/kg)           |              |                      |                      |                      |                      |                      |
|                                         | Benz(a)anthracene (mg/kg wwt)       |              |                      |                      |                      |                      |                      |
|                                         | Benzo(a)pyrene (mg/kg)              |              |                      |                      |                      |                      |                      |
|                                         | Benzo(a)pyrene (mg/kg wwt)          |              |                      |                      |                      |                      |                      |
|                                         | Benzo(b)fluoranthene (mg/kg)        |              |                      |                      |                      |                      |                      |
|                                         | Benzo(b)fluoranthene (mg/kg wwt)    |              |                      |                      |                      |                      |                      |
|                                         | Benzo(g,h,i)perylene (mg/kg)        |              |                      |                      |                      |                      |                      |
|                                         | Benzo(g,h,i)perylene (mg/kg wwt)    |              |                      |                      |                      |                      |                      |
|                                         | Benzo(k)fluoranthene (mg/kg)        |              |                      |                      |                      |                      |                      |
|                                         | Benzo(k)fluoranthene (mg/kg wwt)    |              |                      |                      |                      |                      |                      |
|                                         | Chrysene (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                         | Chrysene (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                         | Dibenz(a,h)anthracene (mg/kg)       |              |                      |                      |                      |                      |                      |
|                                         | Dibenz(a,h)anthracene (mg/kg wwt)   |              |                      |                      |                      |                      |                      |
|                                         | Fluoranthene (mg/kg)                |              |                      |                      |                      |                      |                      |
|                                         | Fluoranthene (mg/kg wwt)            |              |                      |                      |                      |                      |                      |
|                                         | Fluorene (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                         | Fluorene (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg)     |              |                      |                      |                      |                      |                      |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg wwt) |              |                      |                      |                      |                      |                      |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                     | Sample ID    |        |  |  |  |
|-------------------------------------------------|-------------------------------------|--------------|--------|--|--|--|
|                                                 |                                     | Description  |        |  |  |  |
|                                                 |                                     | Sampled Date |        |  |  |  |
|                                                 |                                     | Sampled Time |        |  |  |  |
|                                                 |                                     | Client ID    |        |  |  |  |
| Grouping                                        | Analyte                             |              |        |  |  |  |
| <b>TISSUE</b>                                   |                                     |              |        |  |  |  |
| <b>Metals</b>                                   | Strontium (Sr)-Total (mg/kg)        | 325          | 171    |  |  |  |
|                                                 | Strontium (Sr)-Total (mg/kg wwt)    | 88.3         | 51.4   |  |  |  |
|                                                 | Thallium (Tl)-Total (mg/kg)         | <0.060       | <0.060 |  |  |  |
|                                                 | Thallium (Tl)-Total (mg/kg wwt)     | <0.020       | <0.020 |  |  |  |
|                                                 | Tin (Sn)-Total (mg/kg)              | <0.40        | <0.40  |  |  |  |
|                                                 | Tin (Sn)-Total (mg/kg wwt)          | <0.10        | <0.10  |  |  |  |
|                                                 | Uranium (U)-Total (mg/kg)           | 0.032        | 0.049  |  |  |  |
|                                                 | Uranium (U)-Total (mg/kg wwt)       | 0.0087       | 0.0147 |  |  |  |
|                                                 | Vanadium (V)-Total (mg/kg)          | <1.0         | <1.0   |  |  |  |
|                                                 | Vanadium (V)-Total (mg/kg wwt)      | <0.20        | <0.20  |  |  |  |
|                                                 | Zinc (Zn)-Total (mg/kg)             | 114          | 101    |  |  |  |
|                                                 | Zinc (Zn)-Total (mg/kg wwt)         | 30.9         | 30.4   |  |  |  |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Acenaphthene (mg/kg)                |              | <0.050 |  |  |  |
|                                                 | Acenaphthene (mg/kg wwt)            |              | <0.010 |  |  |  |
|                                                 | Acenaphthylene (mg/kg)              |              | <0.050 |  |  |  |
|                                                 | Acenaphthylene (mg/kg wwt)          |              | <0.010 |  |  |  |
|                                                 | Anthracene (mg/kg)                  |              | <0.050 |  |  |  |
|                                                 | Anthracene (mg/kg wwt)              |              | <0.010 |  |  |  |
|                                                 | Benz(a)anthracene (mg/kg)           |              | <0.050 |  |  |  |
|                                                 | Benz(a)anthracene (mg/kg wwt)       |              | <0.010 |  |  |  |
|                                                 | Benzo(a)pyrene (mg/kg)              |              | <0.050 |  |  |  |
|                                                 | Benzo(a)pyrene (mg/kg wwt)          |              | <0.010 |  |  |  |
|                                                 | Benzo(b)fluoranthene (mg/kg)        |              | <0.050 |  |  |  |
|                                                 | Benzo(b)fluoranthene (mg/kg wwt)    |              | <0.010 |  |  |  |
|                                                 | Benzo(g,h,i)perylene (mg/kg)        |              | <0.050 |  |  |  |
|                                                 | Benzo(g,h,i)perylene (mg/kg wwt)    |              | <0.010 |  |  |  |
|                                                 | Benzo(k)fluoranthene (mg/kg)        |              | <0.050 |  |  |  |
|                                                 | Benzo(k)fluoranthene (mg/kg wwt)    |              | <0.010 |  |  |  |
|                                                 | Chrysene (mg/kg)                    |              | <0.050 |  |  |  |
|                                                 | Chrysene (mg/kg wwt)                |              | <0.010 |  |  |  |
|                                                 | Dibenz(a,h)anthracene (mg/kg)       |              | <0.050 |  |  |  |
|                                                 | Dibenz(a,h)anthracene (mg/kg wwt)   |              | <0.010 |  |  |  |
|                                                 | Fluoranthene (mg/kg)                |              | <0.050 |  |  |  |
|                                                 | Fluoranthene (mg/kg wwt)            |              | <0.010 |  |  |  |
|                                                 | Fluorene (mg/kg)                    |              | <0.050 |  |  |  |
|                                                 | Fluorene (mg/kg wwt)                |              | <0.010 |  |  |  |
|                                                 | Indeno(1,2,3-c,d)pyrene (mg/kg)     |              | <0.050 |  |  |  |
|                                                 | Indeno(1,2,3-c,d)pyrene (mg/kg wwt) |              | <0.010 |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L680075-1 | L680075-2 | L680075-3 | L680075-4 | L680075-5 |
|-------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Grouping                                        | Analyte                                     |                                                                       | RAY 1     | RAY 2     | RAY 3     | FISH 1    | FISH 2    |
| <b>TISSUE</b>                                   |                                             |                                                                       |           |           |           |           |           |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Naphthalene (mg/kg)                         |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | Naphthalene (mg/kg wwt)                     |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | Phenanthrene (mg/kg)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | Phenanthrene (mg/kg wwt)                    |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | Pyrene (mg/kg)                              |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | Pyrene (mg/kg wwt)                          |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | Surrogate: d10-Acenaphthene (SS) (%)        |                                                                       | 86        |           |           |           | 39        |
|                                                 | Surrogate: d12-Chrysene (SS) (%)            |                                                                       | 103       |           |           |           | 48        |
|                                                 | Surrogate: d8-Naphthalene (SS) (%)          |                                                                       | 84        |           |           |           | 38        |
|                                                 | Surrogate: d10-Phenanthrene (SS) (%)        |                                                                       | 83        |           |           |           | 39        |
| <b>Polychlorinated<br/>Biphenyls</b>            | PCB-1016 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1016 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1221 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1221 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1232 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1232 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1242 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1242 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1248 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1248 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1254 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1254 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1260 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1260 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1262 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1262 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | PCB-1268 (mg/kg)                            |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | PCB-1268 (mg/kg wwt)                        |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       | <0.25     |           |           |           | <0.25     |
|                                                 | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       | <0.050    |           |           |           | <0.050    |
| <b>Organochlorine<br/>Pesticides</b>            | Aldrin (mg/kg)                              |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | Aldrin (mg/kg wwt)                          |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | alpha-BHC (mg/kg)                           |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | alpha-BHC (mg/kg wwt)                       |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | beta-BHC (mg/kg)                            |                                                                       | <0.050    |           |           |           | <0.050    |
|                                                 | beta-BHC (mg/kg wwt)                        |                                                                       | <0.010    |           |           |           | <0.010    |
|                                                 | Lindane (gamma - BHC) (mg/kg)               |                                                                       | <0.050    |           |           |           | <0.050    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L680075-6 | L680075-7 | L680075-8 | L680075-9 | L680075-10 |
|-----------------------------------------------------------------------|---------------------------------------------|-----------|-----------|-----------|-----------|------------|
|                                                                       |                                             | FISH 3    | FISH 4    | FISH 5    | FISH 6    | FISH 7     |
| Grouping                                                              | Analyte                                     |           |           |           |           |            |
| <b>TISSUE</b>                                                         |                                             |           |           |           |           |            |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Naphthalene (mg/kg)                         |           |           |           |           |            |
|                                                                       | Naphthalene (mg/kg wwt)                     |           |           |           |           |            |
|                                                                       | Phenanthrene (mg/kg)                        |           |           |           |           |            |
|                                                                       | Phenanthrene (mg/kg wwt)                    |           |           |           |           |            |
|                                                                       | Pyrene (mg/kg)                              |           |           |           |           |            |
|                                                                       | Pyrene (mg/kg wwt)                          |           |           |           |           |            |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |           |           |           |           |            |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |           |           |           |           |            |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |           |           |           |           |            |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |           |           |           |           |            |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1016 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1221 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1221 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1232 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1232 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1242 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1242 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1248 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1248 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1254 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1254 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1260 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1260 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1262 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1262 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | PCB-1268 (mg/kg)                            |           |           |           |           |            |
|                                                                       | PCB-1268 (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |           |           |           |           |            |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |           |           |           |           |            |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |           |           |           |           |            |
|                                                                       | Aldrin (mg/kg wwt)                          |           |           |           |           |            |
|                                                                       | alpha-BHC (mg/kg)                           |           |           |           |           |            |
|                                                                       | alpha-BHC (mg/kg wwt)                       |           |           |           |           |            |
|                                                                       | beta-BHC (mg/kg)                            |           |           |           |           |            |
|                                                                       | beta-BHC (mg/kg wwt)                        |           |           |           |           |            |
|                                                                       | Lindane (gamma - BHC) (mg/kg)               |           |           |           |           |            |



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| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L680075-11 | L680075-12 | L680075-13              | L680075-14              | L680075-15              |
|-----------------------------------------------------------------------|---------------------------------------------|------------|------------|-------------------------|-------------------------|-------------------------|
| Grouping Analyte                                                      |                                             | FISH 8     | FISH 9     | DIAPTERUS<br>PLUMIEN #1 | DIAPTERUS<br>PLUMIEN #2 | DIAPTERUS<br>PLUMIEN #3 |
| TISSUE                                                                |                                             |            |            |                         |                         |                         |
| Polycyclic<br>Aromatic<br>Hydrocarbons                                | Naphthalene (mg/kg)                         |            |            |                         |                         |                         |
|                                                                       | Naphthalene (mg/kg wwt)                     |            |            |                         |                         |                         |
|                                                                       | Phenanthrene (mg/kg)                        |            |            |                         |                         |                         |
|                                                                       | Phenanthrene (mg/kg wwt)                    |            |            |                         |                         |                         |
|                                                                       | Pyrene (mg/kg)                              |            |            |                         |                         |                         |
|                                                                       | Pyrene (mg/kg wwt)                          |            |            |                         |                         |                         |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |            |            |                         |                         |                         |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |            |            |                         |                         |                         |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |            |            |                         |                         |                         |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |            |            |                         |                         |                         |
| Polychlorinated<br>Biphenyls                                          | PCB-1016 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1016 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1221 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1221 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1232 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1232 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1242 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1242 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1248 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1248 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1254 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1254 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1260 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1260 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1262 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1262 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | PCB-1268 (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | PCB-1268 (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |            |            |                         |                         |                         |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |            |            |                         |                         |                         |
| Organochlorine<br>Pesticides                                          | Aldrin (mg/kg)                              |            |            |                         |                         |                         |
|                                                                       | Aldrin (mg/kg wwt)                          |            |            |                         |                         |                         |
|                                                                       | alpha-BHC (mg/kg)                           |            |            |                         |                         |                         |
|                                                                       | alpha-BHC (mg/kg wwt)                       |            |            |                         |                         |                         |
|                                                                       | beta-BHC (mg/kg)                            |            |            |                         |                         |                         |
|                                                                       | beta-BHC (mg/kg wwt)                        |            |            |                         |                         |                         |
|                                                                       | Lindane (gamma - BHC) (mg/kg)               |            |            |                         |                         |                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L680075-16              | L680075-17              | L680075-18              | L680075-19              | L680075-20              |
|-------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Grouping                                        | Analyte                                     |                                                                       | DIAPTERUS<br>PLUMIEN #4 | DIAPTERUS<br>PLUMIEN #5 | DIAPTERUS<br>PLUMIEN #6 | DIAPTERUS<br>PLUMIEN #7 | DIAPTERUS<br>PLUMIEN #8 |
| <b>TISSUE</b>                                   |                                             |                                                                       |                         |                         |                         |                         |                         |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Naphthalene (mg/kg)                         |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Naphthalene (mg/kg wwt)                     |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Phenanthrene (mg/kg)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Phenanthrene (mg/kg wwt)                    |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Pyrene (mg/kg)                              |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Pyrene (mg/kg wwt)                          |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Surrogate: d10-Acenaphthene (SS) (%)        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Surrogate: d12-Chrysene (SS) (%)            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Surrogate: d8-Naphthalene (SS) (%)          |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Surrogate: d10-Phenanthrene (SS) (%)        |                                                                       |                         |                         |                         |                         |                         |
| <b>Polychlorinated<br/>Biphenyls</b>            | PCB-1016 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1016 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1221 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1221 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1232 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1232 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1242 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1242 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1248 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1248 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1254 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1254 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1260 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1260 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1262 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1262 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1268 (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | PCB-1268 (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       |                         |                         |                         |                         |                         |
| <b>Organochlorine<br/>Pesticides</b>            | Aldrin (mg/kg)                              |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Aldrin (mg/kg wwt)                          |                                                                       |                         |                         |                         |                         |                         |
|                                                 | alpha-BHC (mg/kg)                           |                                                                       |                         |                         |                         |                         |                         |
|                                                 | alpha-BHC (mg/kg wwt)                       |                                                                       |                         |                         |                         |                         |                         |
|                                                 | beta-BHC (mg/kg)                            |                                                                       |                         |                         |                         |                         |                         |
|                                                 | beta-BHC (mg/kg wwt)                        |                                                                       |                         |                         |                         |                         |                         |
|                                                 | Lindane (gamma - BHC) (mg/kg)               |                                                                       |                         |                         |                         |                         |                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                             | Sample ID    |  |        |  |  |
|-----------------------------------------|---------------------------------------------|--------------|--|--------|--|--|
|                                         |                                             | Description  |  |        |  |  |
|                                         |                                             | Sampled Date |  |        |  |  |
|                                         |                                             | Sampled Time |  |        |  |  |
|                                         |                                             | Client ID    |  |        |  |  |
| Grouping                                | Analyte                                     |              |  |        |  |  |
| <b>TISSUE</b>                           |                                             |              |  |        |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Naphthalene (mg/kg)                         |              |  | <0.050 |  |  |
|                                         | Naphthalene (mg/kg wwt)                     |              |  | <0.010 |  |  |
|                                         | Phenanthrene (mg/kg)                        |              |  | <0.050 |  |  |
|                                         | Phenanthrene (mg/kg wwt)                    |              |  | <0.010 |  |  |
|                                         | Pyrene (mg/kg)                              |              |  | <0.050 |  |  |
|                                         | Pyrene (mg/kg wwt)                          |              |  | <0.010 |  |  |
|                                         | Surrogate: d10-Acenaphthene (SS) (%)        |              |  | 94     |  |  |
|                                         | Surrogate: d12-Chrysene (SS) (%)            |              |  | 117    |  |  |
|                                         | Surrogate: d8-Naphthalene (SS) (%)          |              |  | 90     |  |  |
|                                         | Surrogate: d10-Phenanthrene (SS) (%)        |              |  | 90     |  |  |
| <b>Polychlorinated Biphenyls</b>        | PCB-1016 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1016 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1221 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1221 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1232 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1232 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1242 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1242 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1248 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1248 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1254 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1254 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1260 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1260 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1262 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1262 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | PCB-1268 (mg/kg)                            |              |  | <0.25  |  |  |
|                                         | PCB-1268 (mg/kg wwt)                        |              |  | <0.050 |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg)     |              |  | <0.25  |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg wwt) |              |  | <0.050 |  |  |
| <b>Organochlorine Pesticides</b>        | Aldrin (mg/kg)                              |              |  | <0.050 |  |  |
|                                         | Aldrin (mg/kg wwt)                          |              |  | <0.010 |  |  |
|                                         | alpha-BHC (mg/kg)                           |              |  | <0.050 |  |  |
|                                         | alpha-BHC (mg/kg wwt)                       |              |  | <0.010 |  |  |
|                                         | beta-BHC (mg/kg)                            |              |  | <0.050 |  |  |
|                                         | beta-BHC (mg/kg wwt)                        |              |  | <0.010 |  |  |
|                                         | Lindane (gamma - BHC) (mg/kg)               |              |  | <0.050 |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L680075-1 | L680075-2 | L680075-3 | L680075-4 | L680075-5 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|
| Grouping                             | Analyte                             |                                                                       | RAY 1     | RAY 2     | RAY 3     | FISH 1    | FISH 2    |
| <b>TISSUE</b>                        |                                     |                                                                       |           |           |           |           |           |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | delta-BHC (mg/kg)                   |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Dieldrin (mg/kg)                    |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Endosulfan I (mg/kg)                |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Endosulfan II (mg/kg)               |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Endrin (mg/kg)                      |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Endrin (mg/kg wwt)                  |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Heptachlor (mg/kg)                  |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Methoxychlor (mg/kg)                |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | Mirex (mg/kg)                       |                                                                       | <0.050    |           |           |           | <0.050    |
|                                      | Mirex (mg/kg wwt)                   |                                                                       | <0.010    |           |           |           | <0.010    |
|                                      | cis-Nonachlor (mg/kg)               |                                                                       | <0.050    |           |           |           | <0.050    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L680075-6 | L680075-7 | L680075-8 | L680075-9 | L680075-10 |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------|-----------|-----------|-----------|------------|
| Grouping                             | Analyte                             |                                                                       | FISH 3    | FISH 4    | FISH 5    | FISH 6    | FISH 7     |
| <b>TISSUE</b>                        |                                     |                                                                       |           |           |           |           |            |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |           |           |           |           |            |
|                                      | delta-BHC (mg/kg)                   |                                                                       |           |           |           |           |            |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |           |           |           |           |            |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |           |           |           |           |            |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |           |           |           |           |            |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |           |           |           |           |            |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | Dieldrin (mg/kg)                    |                                                                       |           |           |           |           |            |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |           |           |           |           |            |
|                                      | Endosulfan I (mg/kg)                |                                                                       |           |           |           |           |            |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |           |           |           |           |            |
|                                      | Endosulfan II (mg/kg)               |                                                                       |           |           |           |           |            |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |           |           |           |           |            |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |           |           |           |           |            |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |           |           |           |           |            |
|                                      | Endrin (mg/kg)                      |                                                                       |           |           |           |           |            |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |           |           |           |           |            |
|                                      | Heptachlor (mg/kg)                  |                                                                       |           |           |           |           |            |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |           |           |           |           |            |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |           |           |           |           |            |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |           |           |           |           |            |
|                                      | Methoxychlor (mg/kg)                |                                                                       |           |           |           |           |            |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |           |           |           |           |            |
|                                      | Mirex (mg/kg)                       |                                                                       |           |           |           |           |            |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |           |           |           |           |            |
|                                      | cis-Nonachlor (mg/kg)               |                                                                       |           |           |           |           |            |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L680075-11 | L680075-12 | L680075-13              | L680075-14              | L680075-15              |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|------------|------------|-------------------------|-------------------------|-------------------------|
| Grouping                             | Analyte                             |                                                                       | FISH 8     | FISH 9     | DIAPTERUS<br>PLUMIEN #1 | DIAPTERUS<br>PLUMIEN #2 | DIAPTERUS<br>PLUMIEN #3 |
| <b>TISSUE</b>                        |                                     |                                                                       |            |            |                         |                         |                         |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |            |            |                         |                         |                         |
|                                      | delta-BHC (mg/kg)                   |                                                                       |            |            |                         |                         |                         |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |            |            |                         |                         |                         |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |            |            |                         |                         |                         |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |            |            |                         |                         |                         |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |            |            |                         |                         |                         |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | Dieldrin (mg/kg)                    |                                                                       |            |            |                         |                         |                         |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan I (mg/kg)                |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan II (mg/kg)               |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |            |            |                         |                         |                         |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |            |            |                         |                         |                         |
|                                      | Endrin (mg/kg)                      |                                                                       |            |            |                         |                         |                         |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |            |            |                         |                         |                         |
|                                      | Heptachlor (mg/kg)                  |                                                                       |            |            |                         |                         |                         |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |            |            |                         |                         |                         |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |            |            |                         |                         |                         |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |            |            |                         |                         |                         |
|                                      | Methoxychlor (mg/kg)                |                                                                       |            |            |                         |                         |                         |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |            |            |                         |                         |                         |
|                                      | Mirex (mg/kg)                       |                                                                       |            |            |                         |                         |                         |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |            |            |                         |                         |                         |
|                                      | cis-Nonachlor (mg/kg)               |                                                                       |            |            |                         |                         |                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                     | Sample ID    | L680075-16           | L680075-17           | L680075-18           | L680075-19           | L680075-20           |
|----------------------------------|-------------------------------------|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                                  |                                     | Description  |                      |                      |                      |                      |                      |
|                                  |                                     | Sampled Date | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            | 12-NOV-07            |
|                                  |                                     | Sampled Time |                      |                      |                      |                      |                      |
|                                  |                                     | Client ID    | DIAPTERUS PLUMIEN #4 | DIAPTERUS PLUMIEN #5 | DIAPTERUS PLUMIEN #6 | DIAPTERUS PLUMIEN #7 | DIAPTERUS PLUMIEN #8 |
| Grouping                         | Analyte                             |              |                      |                      |                      |                      |                      |
| <b>TISSUE</b>                    |                                     |              |                      |                      |                      |                      |                      |
| <b>Organochlorine Pesticides</b> | Lindane (gamma - BHC) (mg/kg wwt)   |              |                      |                      |                      |                      |                      |
|                                  | delta-BHC (mg/kg)                   |              |                      |                      |                      |                      |                      |
|                                  | delta-BHC (mg/kg wwt)               |              |                      |                      |                      |                      |                      |
|                                  | cis-Chlordane (alpha) (mg/kg)       |              |                      |                      |                      |                      |                      |
|                                  | cis-Chlordane (alpha) (mg/kg wwt)   |              |                      |                      |                      |                      |                      |
|                                  | trans-Chlordane (gamma) (mg/kg)     |              |                      |                      |                      |                      |                      |
|                                  | trans-Chlordane (gamma) (mg/kg wwt) |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDD (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDD (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDD (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDD (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDE (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDE (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDE (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDE (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDT (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 2,4'-DDT (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDT (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | 4,4'-DDT (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | Dieldrin (mg/kg)                    |              |                      |                      |                      |                      |                      |
|                                  | Dieldrin (mg/kg wwt)                |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan I (mg/kg)                |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan I (mg/kg wwt)            |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan II (mg/kg)               |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan II (mg/kg wwt)           |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan Sulfate (mg/kg)          |              |                      |                      |                      |                      |                      |
|                                  | Endosulfan Sulfate (mg/kg wwt)      |              |                      |                      |                      |                      |                      |
|                                  | Endrin (mg/kg)                      |              |                      |                      |                      |                      |                      |
|                                  | Endrin (mg/kg wwt)                  |              |                      |                      |                      |                      |                      |
|                                  | Heptachlor (mg/kg)                  |              |                      |                      |                      |                      |                      |
|                                  | Heptachlor (mg/kg wwt)              |              |                      |                      |                      |                      |                      |
|                                  | Heptachlor Epoxide (mg/kg)          |              |                      |                      |                      |                      |                      |
|                                  | Heptachlor Epoxide (mg/kg wwt)      |              |                      |                      |                      |                      |                      |
|                                  | Methoxychlor (mg/kg)                |              |                      |                      |                      |                      |                      |
|                                  | Methoxychlor (mg/kg wwt)            |              |                      |                      |                      |                      |                      |
|                                  | Mirex (mg/kg)                       |              |                      |                      |                      |                      |                      |
|                                  | Mirex (mg/kg wwt)                   |              |                      |                      |                      |                      |                      |
|                                  | cis-Nonachlor (mg/kg)               |              |                      |                      |                      |                      |                      |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID    |  |        |  |  |
|--------------------------------------|-------------------------------------|--------------|--|--------|--|--|
|                                      |                                     | Description  |  |        |  |  |
|                                      |                                     | Sampled Date |  |        |  |  |
|                                      |                                     | Sampled Time |  |        |  |  |
|                                      |                                     | Client ID    |  |        |  |  |
| Grouping                             | Analyte                             |              |  |        |  |  |
| <b>TISSUE</b>                        |                                     |              |  |        |  |  |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg wwt)   |              |  | <0.010 |  |  |
|                                      | delta-BHC (mg/kg)                   |              |  | <0.050 |  |  |
|                                      | delta-BHC (mg/kg wwt)               |              |  | <0.010 |  |  |
|                                      | cis-Chlordane (alpha) (mg/kg)       |              |  | <0.050 |  |  |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |              |  | <0.010 |  |  |
|                                      | trans-Chlordane (gamma) (mg/kg)     |              |  | <0.050 |  |  |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |              |  | <0.010 |  |  |
|                                      | 2,4'-DDD (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 2,4'-DDD (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | 4,4'-DDD (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 4,4'-DDD (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | 2,4'-DDE (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 2,4'-DDE (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | 4,4'-DDE (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 4,4'-DDE (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | 2,4'-DDT (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 2,4'-DDT (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | 4,4'-DDT (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | 4,4'-DDT (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | Dieldrin (mg/kg)                    |              |  | <0.050 |  |  |
|                                      | Dieldrin (mg/kg wwt)                |              |  | <0.010 |  |  |
|                                      | Endosulfan I (mg/kg)                |              |  | <0.050 |  |  |
|                                      | Endosulfan I (mg/kg wwt)            |              |  | <0.010 |  |  |
|                                      | Endosulfan II (mg/kg)               |              |  | <0.050 |  |  |
|                                      | Endosulfan II (mg/kg wwt)           |              |  | <0.010 |  |  |
|                                      | Endosulfan Sulfate (mg/kg)          |              |  | <0.050 |  |  |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |              |  | <0.010 |  |  |
|                                      | Endrin (mg/kg)                      |              |  | <0.050 |  |  |
|                                      | Endrin (mg/kg wwt)                  |              |  | <0.010 |  |  |
|                                      | Heptachlor (mg/kg)                  |              |  | <0.050 |  |  |
|                                      | Heptachlor (mg/kg wwt)              |              |  | <0.010 |  |  |
|                                      | Heptachlor Epoxide (mg/kg)          |              |  | <0.050 |  |  |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |              |  | <0.010 |  |  |
|                                      | Methoxychlor (mg/kg)                |              |  | <0.050 |  |  |
|                                      | Methoxychlor (mg/kg wwt)            |              |  | <0.010 |  |  |
|                                      | Mirex (mg/kg)                       |              |  | <0.050 |  |  |
|                                      | Mirex (mg/kg wwt)                   |              |  | <0.010 |  |  |
|                                      | cis-Nonachlor (mg/kg)               |              |  | <0.050 |  |  |



ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L680075-1 | L680075-2 | L680075-3 | L680075-4 | L680075-5 |
|------------------------------|-----------------------------|--------------|-----------|-----------|-----------|-----------|-----------|
|                              |                             | Description  |           |           |           |           |           |
|                              |                             | Sampled Date |           |           |           |           |           |
|                              |                             | Sampled Time |           |           |           |           |           |
|                              |                             | Client ID    | RAY 1     | RAY 2     | RAY 3     | FISH 1    | FISH 2    |
| Grouping                     | Analyte                     |              |           |           |           |           |           |
| TISSUE                       |                             |              |           |           |           |           |           |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   |              | <0.010    |           |           |           | <0.010    |
|                              | trans-Nonachlor (mg/kg)     |              | <0.050    |           |           |           | <0.050    |
|                              | trans-Nonachlor (mg/kg wwt) |              | <0.010    |           |           |           | <0.010    |
|                              | Oxychlordane (mg/kg)        |              | <0.050    |           |           |           | <0.050    |
|                              | Oxychlordane (mg/kg wwt)    |              | <0.010    |           |           |           | <0.010    |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L680075-6 | L680075-7 | L680075-8 | L680075-9 | L680075-10 |
|-----------------------------------------------------------------------|-----------------------------|-----------|-----------|-----------|-----------|------------|
| Grouping Analyte                                                      |                             | FISH 3    | FISH 4    | FISH 5    | FISH 6    | FISH 7     |
| TISSUE                                                                |                             |           |           |           |           |            |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |           |           |           |           |            |
|                                                                       | trans-Nonachlor (mg/kg)     |           |           |           |           |            |
|                                                                       | trans-Nonachlor (mg/kg wwt) |           |           |           |           |            |
|                                                                       | Oxychlordane (mg/kg)        |           |           |           |           |            |
|                                                                       | Oxychlordane (mg/kg wwt)    |           |           |           |           |            |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L680075-11 | L680075-12 | L680075-13              | L680075-14              | L680075-15              |
|-----------------------------------------------------------------------|-----------------------------|------------|------------|-------------------------|-------------------------|-------------------------|
| Grouping                                                              | Analyte                     | FISH 8     | FISH 9     | DIAPTERUS<br>PLUMIEN #1 | DIAPTERUS<br>PLUMIEN #2 | DIAPTERUS<br>PLUMIEN #3 |
| TISSUE                                                                |                             |            |            |                         |                         |                         |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |            |            |                         |                         |                         |
|                                                                       | trans-Nonachlor (mg/kg)     |            |            |                         |                         |                         |
|                                                                       | trans-Nonachlor (mg/kg wwt) |            |            |                         |                         |                         |
|                                                                       | Oxychlordane (mg/kg)        |            |            |                         |                         |                         |
|                                                                       | Oxychlordane (mg/kg wwt)    |            |            |                         |                         |                         |

ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    | L680075-16              | L680075-17              | L680075-18              | L680075-19              | L680075-20              |
|------------------------------|-----------------------------|--------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
|                              |                             | Description  |                         |                         |                         |                         |                         |
|                              |                             | Sampled Date | 12-NOV-07               | 12-NOV-07               | 12-NOV-07               | 12-NOV-07               | 12-NOV-07               |
|                              |                             | Sampled Time |                         |                         |                         |                         |                         |
|                              |                             | Client ID    | DIAPTERUS<br>PLUMIEN #4 | DIAPTERUS<br>PLUMIEN #5 | DIAPTERUS<br>PLUMIEN #6 | DIAPTERUS<br>PLUMIEN #7 | DIAPTERUS<br>PLUMIEN #8 |
| Grouping                     | Analyte                     |              |                         |                         |                         |                         |                         |
| TISSUE                       |                             |              |                         |                         |                         |                         |                         |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   |              |                         |                         |                         |                         |                         |
|                              | trans-Nonachlor (mg/kg)     |              |                         |                         |                         |                         |                         |
|                              | trans-Nonachlor (mg/kg wwt) |              |                         |                         |                         |                         |                         |
|                              | Oxychlordane (mg/kg)        |              |                         |                         |                         |                         |                         |
|                              | Oxychlordane (mg/kg wwt)    |              |                         |                         |                         |                         |                         |

ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             |              |                         |                          |  |  |  |
|------------------------------|-----------------------------|--------------|-------------------------|--------------------------|--|--|--|
|                              |                             | Sample ID    | L680075-21              | L680075-22               |  |  |  |
|                              |                             | Description  |                         |                          |  |  |  |
|                              |                             | Sampled Date | 12-NOV-07               | 12-NOV-07                |  |  |  |
|                              |                             | Sampled Time |                         |                          |  |  |  |
|                              |                             | Client ID    | DIAPTERUS<br>PLUMIEN #9 | DIAPTERUS<br>PLUMIEN #10 |  |  |  |
| Grouping                     | Analyte                     |              |                         |                          |  |  |  |
| TISSUE                       |                             |              |                         |                          |  |  |  |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   |              |                         | <0.010                   |  |  |  |
|                              | trans-Nonachlor (mg/kg)     |              |                         | <0.050                   |  |  |  |
|                              | trans-Nonachlor (mg/kg wwt) |              |                         | <0.010                   |  |  |  |
|                              | Oxychlordane (mg/kg)        |              |                         | <0.050                   |  |  |  |
|                              | Oxychlordane (mg/kg wwt)    |              |                         | <0.010                   |  |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-DRY-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MET-WET-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MOISTURE-TISS-VA** Tissue % Moisture in Tissues ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

**OCP1-TDRY-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**OCP1-TWET-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**PAH-T-DRY-SOX-MS-VA** Tissue PAHs in Tissue by Soxhlet GCMS EPA METHODS 3540, 3600 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

**PAH-T-WET-SOX-MS-VA** Tissue PAHs in Tissue by Soxhlet GCMS EPA METHODS 3540, 3600 & 8270

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

**PCB-T-DRY-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**PCB-T-WET-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**SE-DRY-HVAAS-VA** Tissue Selenium in Tissue by HVAAS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

**SE-WET-HVAAS-VA** Tissue Selenium in Tissue by HVAAS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

### GLOSSARY OF REPORT TERMS

**Surr** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency.  
**mg/kg (units)** - unit of concentration based on mass, parts per million  
**mg/L (units)** - unit of concentration based on volume, parts per million  
**N/A** - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.  
 UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.  
 Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



**Environmental Division**

# ALS Laboratory Group Quality Control Report

Workorder: L680075

Report Date: 07-NOV-08

Page 1 of 22

Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: ADRIAN DE BRUYN

| Test                   | Matrix         | Reference           | Result  | Qualifier | Units     | RPD   | Limit  | Analyzed  |
|------------------------|----------------|---------------------|---------|-----------|-----------|-------|--------|-----------|
| <b>HG-DRY-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |           |       |        |           |
| <b>Batch</b>           | <b>R751290</b> |                     |         |           |           |       |        |           |
| <b>WG864993-6</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 84      |           | %         |       | 80-120 | 04-NOV-08 |
| <b>WG864993-1</b>      | <b>MB</b>      |                     |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0050 |           | mg/kg     |       | 0.005  | 04-NOV-08 |
| <b>WG864993-2</b>      | <b>MB</b>      |                     |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0050 |           | mg/kg     |       | 0.005  | 04-NOV-08 |
| <b>Batch</b>           | <b>R751398</b> |                     |         |           |           |       |        |           |
| <b>WG864993-4</b>      | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 86      |           | %         |       | 85-117 | 04-NOV-08 |
| <b>WG864993-5</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 99      |           | %         |       | 85-115 | 04-NOV-08 |
| <b>WG864993-3</b>      | <b>DUP</b>     | <b>L680075-8</b>    |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                | 0.111               | 0.095   | J         | mg/kg     | 0.016 | 0.06   | 04-NOV-08 |
| <b>Batch</b>           | <b>R752395</b> |                     |         |           |           |       |        |           |
| <b>WG865914-5</b>      | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 100     |           | %         |       | 85-117 | 05-NOV-08 |
| <b>WG865914-6</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 103     |           | %         |       | 85-115 | 05-NOV-08 |
| <b>Batch</b>           | <b>R752566</b> |                     |         |           |           |       |        |           |
| <b>WG865914-8</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 85      |           | %         |       | 80-120 | 06-NOV-08 |
| <b>WG865914-4</b>      | <b>DUP</b>     | <b>L680075-15</b>   |         |           |           |       |        |           |
| <b>WG865914-1</b>      | <b>MB</b>      |                     |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0050 |           | mg/kg     |       | 0.005  | 06-NOV-08 |
| <b>HG-WET-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |           |       |        |           |
| <b>Batch</b>           | <b>R751290</b> |                     |         |           |           |       |        |           |
| <b>WG864993-6</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 84      |           | %         |       | 80-120 | 04-NOV-08 |
| <b>WG864993-1</b>      | <b>MB</b>      |                     |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg wwt |       | 0.001  | 04-NOV-08 |
| <b>WG864993-2</b>      | <b>MB</b>      |                     |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg wwt |       | 0.001  | 04-NOV-08 |
| <b>Batch</b>           | <b>R751367</b> |                     |         |           |           |       |        |           |
| <b>WG864993-4</b>      | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 86      |           | %         |       | 85-117 | 04-NOV-08 |
| <b>WG864993-5</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |           |       |        |           |
| Mercury (Hg)-Total     |                |                     | 99      |           | %         |       | 85-115 | 04-NOV-08 |
| <b>WG864993-3</b>      | <b>DUP</b>     | <b>L680075-8</b>    |         |           |           |       |        |           |



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| Test                   | Matrix         | Reference           | Result  | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------|----------------|---------------------|---------|-----------|-----------|-----|--------|-----------|
| <b>HG-WET-CVAFS-VA</b> |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>           | <b>R751367</b> |                     |         |           |           |     |        |           |
| <b>WG864993-3</b>      | <b>DUP</b>     | <b>L680075-8</b>    |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                | 0.0506              | 0.0435  |           | mg/kg wwt | 15  | 45     | 04-NOV-08 |
| <b>Batch</b>           | <b>R752392</b> |                     |         |           |           |     |        |           |
| <b>WG865914-5</b>      | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 100     |           | %         |     | 85-117 | 05-NOV-08 |
| <b>WG865914-6</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 103     |           | %         |     | 85-115 | 05-NOV-08 |
| <b>Batch</b>           | <b>R752566</b> |                     |         |           |           |     |        |           |
| <b>WG865914-8</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | 85      |           | %         |     | 80-120 | 06-NOV-08 |
| <b>WG865914-1</b>      | <b>MB</b>      |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |                |                     | <0.0010 |           | mg/kg wwt |     | 0.001  | 06-NOV-08 |
| <b>MET-DRY-MS-VA</b>   |                | <b>Tissue</b>       |         |           |           |     |        |           |
| <b>Batch</b>           | <b>R751623</b> |                     |         |           |           |     |        |           |
| <b>WG864993-4</b>      | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |           |     |        |           |
| Aluminum (Al)-Total    |                |                     | 95      |           | %         |     | 52-141 | 03-NOV-08 |
| Arsenic (As)-Total     |                |                     | 110     |           | %         |     | 83-137 | 03-NOV-08 |
| Cadmium (Cd)-Total     |                |                     | 105     |           | %         |     | 76-124 | 03-NOV-08 |
| Calcium (Ca)-Total     |                |                     | 88      |           | %         |     | 53-137 | 03-NOV-08 |
| Cobalt (Co)-Total      |                |                     | 101     |           | %         |     | 73-133 | 03-NOV-08 |
| Copper (Cu)-Total      |                |                     | 90      |           | %         |     | 80-119 | 03-NOV-08 |
| Lead (Pb)-Total        |                |                     | 101     |           | %         |     | 62-144 | 03-NOV-08 |
| Magnesium (Mg)-Total   |                |                     | 80      |           | %         |     | 56-118 | 03-NOV-08 |
| Manganese (Mn)-Total   |                |                     | 105     |           | %         |     | 65-160 | 03-NOV-08 |
| Zinc (Zn)-Total        |                |                     | 99      |           | %         |     | 80-128 | 03-NOV-08 |
| <b>WG864993-5</b>      | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |         |           |           |     |        |           |
| Arsenic (As)-Total     |                |                     | 103     |           | %         |     | 83-108 | 03-NOV-08 |
| Cadmium (Cd)-Total     |                |                     | 103     |           | %         |     | 91-122 | 03-NOV-08 |
| Copper (Cu)-Total      |                |                     | 87      |           | %         |     | 80-108 | 03-NOV-08 |
| Lead (Pb)-Total        |                |                     | 137     |           | %         |     | 67-141 | 03-NOV-08 |
| Manganese (Mn)-Total   |                |                     | 89      |           | %         |     | 81-110 | 03-NOV-08 |
| Molybdenum (Mo)-Total  |                |                     | 110     |           | %         |     | 87-115 | 03-NOV-08 |
| Nickel (Ni)-Total      |                |                     | 88      |           | %         |     | 75-109 | 03-NOV-08 |
| Strontium (Sr)-Total   |                |                     | 83      |           | %         |     | 77-111 | 03-NOV-08 |
| Vanadium (V)-Total     |                |                     | 105     |           | %         |     | 90-125 | 03-NOV-08 |

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| Test                  | Matrix        | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|---------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b> |                     |        |           |       |     |        |           |
| <b>Batch R751623</b>  |               |                     |        |           |       |     |        |           |
| <b>WG864993-5 CRM</b> |               | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Zinc (Zn)-Total       |               |                     | 99     |           | %     |     | 84-118 | 03-NOV-08 |
| <b>WG864993-6 CRM</b> |               | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |               |                     | 87     |           | %     |     | 69-112 | 03-NOV-08 |
| Barium (Ba)-Total     |               |                     | 88     |           | %     |     | 83-119 | 03-NOV-08 |
| Calcium (Ca)-Total    |               |                     | 95     |           | %     |     | 87-114 | 03-NOV-08 |
| Chromium (Cr)-Total   |               |                     | 88     |           | %     |     | 48-89  | 03-NOV-08 |
| Copper (Cu)-Total     |               |                     | 96     |           | %     |     | 86-115 | 03-NOV-08 |
| Lead (Pb)-Total       |               |                     | 96     |           | %     |     | 79-120 | 03-NOV-08 |
| Magnesium (Mg)-Total  |               |                     | 91     |           | %     |     | 65-135 | 03-NOV-08 |
| Manganese (Mn)-Total  |               |                     | 93     |           | %     |     | 86-117 | 03-NOV-08 |
| Strontium (Sr)-Total  |               |                     | 97     |           | %     |     | 93-125 | 03-NOV-08 |
| Zinc (Zn)-Total       |               |                     | 100    |           | %     |     | 84-120 | 03-NOV-08 |
| <b>WG864993-7 CRM</b> |               | <b>VA-NIST-1515</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |               |                     | 82     |           | %     |     | 66-109 | 03-NOV-08 |
| Barium (Ba)-Total     |               |                     | 84     | RM-L      | %     |     | 90-113 | 03-NOV-08 |
| Calcium (Ca)-Total    |               |                     | 91     |           | %     |     | 87-116 | 03-NOV-08 |
| Copper (Cu)-Total     |               |                     | 93     |           | %     |     | 83-114 | 03-NOV-08 |
| Lead (Pb)-Total       |               |                     | 89     |           | %     |     | 70-117 | 03-NOV-08 |
| Magnesium (Mg)-Total  |               |                     | 86     |           | %     |     | 85-115 | 03-NOV-08 |
| Manganese (Mn)-Total  |               |                     | 88     | RM-L      | %     |     | 89-116 | 03-NOV-08 |
| Strontium (Sr)-Total  |               |                     | 91     |           | %     |     | 89-119 | 03-NOV-08 |
| Zinc (Zn)-Total       |               |                     | 95     |           | %     |     | 84-115 | 03-NOV-08 |
| <b>WG864993-1 MB</b>  |               |                     |        |           |       |     |        |           |
| Aluminum (Al)-Total   |               |                     | <10    |           | mg/kg |     | 10     | 03-NOV-08 |
| Antimony (Sb)-Total   |               |                     | <0.050 |           | mg/kg |     | 0.05   | 03-NOV-08 |
| Arsenic (As)-Total    |               |                     | <0.050 |           | mg/kg |     | 0.05   | 03-NOV-08 |
| Barium (Ba)-Total     |               |                     | <0.050 |           | mg/kg |     | 0.05   | 03-NOV-08 |
| Beryllium (Be)-Total  |               |                     | <0.30  |           | mg/kg |     | 0.3    | 03-NOV-08 |
| Bismuth (Bi)-Total    |               |                     | <0.30  |           | mg/kg |     | 0.3    | 03-NOV-08 |
| Cadmium (Cd)-Total    |               |                     | <0.030 |           | mg/kg |     | 0.03   | 03-NOV-08 |
| Calcium (Ca)-Total    |               |                     | <10    |           | mg/kg |     | 10     | 03-NOV-08 |
| Chromium (Cr)-Total   |               |                     | <0.50  |           | mg/kg |     | 0.5    | 03-NOV-08 |
| Cobalt (Co)-Total     |               |                     | <0.10  |           | mg/kg |     | 0.1    | 03-NOV-08 |
| Copper (Cu)-Total     |               |                     | <0.050 |           | mg/kg |     | 0.05   | 03-NOV-08 |

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| Test                  | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b> |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R751623</b> |               |        |           |       |     |       |           |
| <b>WG864993-1</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 03-NOV-08 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 03-NOV-08 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 03-NOV-08 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 03-NOV-08 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 03-NOV-08 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Zinc (Zn)-Total       |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| <b>WG864993-2</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |               | <10    |           | mg/kg |     | 10    | 03-NOV-08 |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 03-NOV-08 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 03-NOV-08 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 03-NOV-08 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 03-NOV-08 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 03-NOV-08 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 03-NOV-08 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 03-NOV-08 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 03-NOV-08 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 03-NOV-08 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 03-NOV-08 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 03-NOV-08 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 03-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>          | <b>R751623</b> |                     |        |           |       |      |        |           |
| <b>WG864993-2</b>     | <b>MB</b>      |                     |        |           |       |      |        |           |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg |      | 0.5    | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg |      | 0.5    | 03-NOV-08 |
| <b>Batch</b>          | <b>R752181</b> |                     |        |           |       |      |        |           |
| <b>WG864993-3</b>     | <b>DUP</b>     | <b>L680075-8</b>    |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                | <20                 | 21     | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Antimony (Sb)-Total   |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Arsenic (As)-Total    |                | 1.37                | 1.27   |           | mg/kg | 7.5  | 45     | 05-NOV-08 |
| Barium (Ba)-Total     |                | 4.11                | 4.27   |           | mg/kg | 3.9  | 45     | 05-NOV-08 |
| Beryllium (Be)-Total  |                | <0.60               | <0.60  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Bismuth (Bi)-Total    |                | <0.60               | <0.60  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Cadmium (Cd)-Total    |                | <0.060              | <0.060 | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Calcium (Ca)-Total    |                | 28700               | 28900  |           | mg/kg | 1.0  | 45     | 05-NOV-08 |
| Chromium (Cr)-Total   |                | <1.0                | <1.0   | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Cobalt (Co)-Total     |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Copper (Cu)-Total     |                | 0.95                | 0.93   | J         | mg/kg | 0.02 | 0.4    | 05-NOV-08 |
| Lead (Pb)-Total       |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Lithium (Li)-Total    |                | <1.0                | <1.0   | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Magnesium (Mg)-Total  |                | 993                 | 961    |           | mg/kg | 3.3  | 45     | 05-NOV-08 |
| Manganese (Mn)-Total  |                | 12.5                | 12.8   |           | mg/kg | 2.5  | 45     | 05-NOV-08 |
| Molybdenum (Mo)-Total |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Nickel (Ni)-Total     |                | <1.0                | <1.0   | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Strontium (Sr)-Total  |                | 32.9                | 33.6   |           | mg/kg | 1.9  | 45     | 05-NOV-08 |
| Thallium (Tl)-Total   |                | <0.060              | <0.060 | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Tin (Sn)-Total        |                | <0.40               | <0.40  | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Uranium (U)-Total     |                | <0.020              | <0.020 | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Vanadium (V)-Total    |                | <1.0                | <1.0   | RPD-NA    | mg/kg | N/A  | 45     | 05-NOV-08 |
| Zinc (Zn)-Total       |                | 62.2                | 60.8   |           | mg/kg | 2.3  | 45     | 05-NOV-08 |
| <b>Batch</b>          | <b>R752575</b> |                     |        |           |       |      |        |           |
| <b>WG865914-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                |                     | 102    |           | %     |      | 52-141 | 05-NOV-08 |
| Arsenic (As)-Total    |                |                     | 113    |           | %     |      | 83-137 | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 110    |           | %     |      | 76-124 | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 94     |           | %     |      | 53-137 | 05-NOV-08 |
| Cobalt (Co)-Total     |                |                     | 108    |           | %     |      | 73-133 | 05-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b>  |                     |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R752575</b> |                     |        |           |       |     |        |           |
| <b>WG865914-5 CRM</b> |                | <b>VA-NIST-2976</b> |        |           |       |     |        |           |
| Copper (Cu)-Total     |                |                     | 102    |           | %     |     | 80-119 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 108    |           | %     |     | 62-144 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 88     |           | %     |     | 56-118 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 111    |           | %     |     | 65-160 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 102    |           | %     |     | 80-128 | 05-NOV-08 |
| <b>WG865914-6 CRM</b> |                | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Arsenic (As)-Total    |                |                     | 103    |           | %     |     | 83-108 | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 105    |           | %     |     | 91-122 | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 92     |           | %     |     | 80-108 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 104    |           | %     |     | 67-141 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 97     |           | %     |     | 81-110 | 05-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | 108    |           | %     |     | 87-115 | 05-NOV-08 |
| Nickel (Ni)-Total     |                |                     | 94     |           | %     |     | 75-109 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 82     |           | %     |     | 77-111 | 05-NOV-08 |
| Vanadium (V)-Total    |                |                     | 114    |           | %     |     | 90-125 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 98     |           | %     |     | 84-118 | 05-NOV-08 |
| <b>WG865914-7 CRM</b> |                | <b>VA-NIST-1515</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 86     |           | %     |     | 66-109 | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | 86     | RM-L      | %     |     | 90-113 | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 99     |           | %     |     | 87-116 | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 102    |           | %     |     | 83-114 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 98     |           | %     |     | 70-117 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 93     |           | %     |     | 85-115 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 114    |           | %     |     | 89-116 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 95     |           | %     |     | 89-119 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 98     |           | %     |     | 84-115 | 05-NOV-08 |
| <b>WG865914-8 CRM</b> |                | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 90     |           | %     |     | 69-112 | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | 90     |           | %     |     | 83-119 | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 104    |           | %     |     | 87-114 | 05-NOV-08 |
| Chromium (Cr)-Total   |                |                     | 80     |           | %     |     | 48-89  | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 106    |           | %     |     | 86-115 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 102    |           | %     |     | 79-120 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 98     |           | %     |     | 65-135 | 05-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R752575</b> |                     |        |           |       |     |        |           |
| <b>WG865914-8 CRM</b> |                | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Manganese (Mn)-Total  |                |                     | 120    | RM-H      | %     |     | 86-117 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 99     |           | %     |     | 93-125 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 105    |           | %     |     | 84-120 | 05-NOV-08 |
| <b>WG865914-1 MB</b>  |                |                     |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |     | 10     | 05-NOV-08 |
| Antimony (Sb)-Total   |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Arsenic (As)-Total    |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Beryllium (Be)-Total  |                |                     | <0.30  |           | mg/kg |     | 0.3    | 05-NOV-08 |
| Bismuth (Bi)-Total    |                |                     | <0.30  |           | mg/kg |     | 0.3    | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | <0.030 |           | mg/kg |     | 0.03   | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | <10    |           | mg/kg |     | 10     | 05-NOV-08 |
| Chromium (Cr)-Total   |                |                     | <0.50  |           | mg/kg |     | 0.5    | 05-NOV-08 |
| Cobalt (Co)-Total     |                |                     | <0.10  |           | mg/kg |     | 0.1    | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | <0.10  |           | mg/kg |     | 0.1    | 05-NOV-08 |
| Lithium (Li)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | <3.0   |           | mg/kg |     | 3      | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg |     | 0.5    | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 05-NOV-08 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg |     | 0.03   | 05-NOV-08 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg |     | 0.2    | 05-NOV-08 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg |     | 0.01   | 05-NOV-08 |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg |     | 0.5    | 05-NOV-08 |
| <b>Batch</b>          | <b>R753157</b> |                     |        |           |       |     |        |           |
| <b>WG865914-4 DUP</b> |                | <b>L680075-15</b>   |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                | 130                 | 119    | J         | mg/kg | 11  | 120    | 06-NOV-08 |
| Antimony (Sb)-Total   |                | <0.15               | <0.15  | RPD-NA    | mg/kg | N/A | 45     | 06-NOV-08 |
| Arsenic (As)-Total    |                | 4.89                | 4.41   |           | mg/kg | 10  | 45     | 06-NOV-08 |
| Barium (Ba)-Total     |                | 11.5                | 10.5   |           | mg/kg | 9.0 | 45     | 06-NOV-08 |
| Beryllium (Be)-Total  |                | <0.90               | <0.90  | RPD-NA    | mg/kg | N/A | 45     | 06-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>          | <b>R753157</b> |                     |        |           |       |      |        |           |
| <b>WG865914-4</b>     | <b>DUP</b>     | <b>L680075-15</b>   |        |           |       |      |        |           |
| Bismuth (Bi)-Total    |                | <0.90               | <0.90  | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Cadmium (Cd)-Total    |                | <0.090              | <0.090 | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Calcium (Ca)-Total    |                | 74800               | 67600  |           | mg/kg | 10   | 45     | 06-NOV-08 |
| Chromium (Cr)-Total   |                | 1.5                 | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Cobalt (Co)-Total     |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Copper (Cu)-Total     |                | 1.65                | 1.46   | J         | mg/kg | 0.18 | 0.6    | 06-NOV-08 |
| Lead (Pb)-Total       |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Lithium (Li)-Total    |                | <1.5                | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Magnesium (Mg)-Total  |                | 2200                | 2010   |           | mg/kg | 9.1  | 45     | 06-NOV-08 |
| Manganese (Mn)-Total  |                | 33.3                | 30.1   |           | mg/kg | 10   | 45     | 06-NOV-08 |
| Molybdenum (Mo)-Total |                | 0.18                | 0.17   | J         | mg/kg | 0.01 | 0.6    | 06-NOV-08 |
| Nickel (Ni)-Total     |                | <1.5                | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Strontium (Sr)-Total  |                | 131                 | 121    |           | mg/kg | 8.7  | 45     | 06-NOV-08 |
| Thallium (Tl)-Total   |                | <0.090              | <0.090 | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Tin (Sn)-Total        |                | <0.60               | <0.60  | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Uranium (U)-Total     |                | 0.034               | <0.030 | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Vanadium (V)-Total    |                | <1.5                | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 06-NOV-08 |
| Zinc (Zn)-Total       |                | 112                 | 101    |           | mg/kg | 10   | 45     | 06-NOV-08 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>          | <b>R751616</b> |                     |        |           |       |      |        |           |
| <b>WG864993-4</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                |                     | 95     |           | %     |      | 52-141 | 03-NOV-08 |
| Arsenic (As)-Total    |                |                     | 110    |           | %     |      | 83-137 | 03-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 105    |           | %     |      | 76-124 | 03-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 88     |           | %     |      | 53-137 | 03-NOV-08 |
| Cobalt (Co)-Total     |                |                     | 101    |           | %     |      | 73-133 | 03-NOV-08 |
| Copper (Cu)-Total     |                |                     | 90     |           | %     |      | 80-119 | 03-NOV-08 |
| Lead (Pb)-Total       |                |                     | 101    |           | %     |      | 62-144 | 03-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 80     |           | %     |      | 56-118 | 03-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 105    |           | %     |      | 65-160 | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 99     |           | %     |      | 80-128 | 03-NOV-08 |
| <b>WG864993-5</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |       |      |        |           |
| Arsenic (As)-Total    |                |                     | 103    |           | %     |      | 83-108 | 03-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 103    |           | %     |      | 91-122 | 03-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|----------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |          |     |        |           |
| <b>Batch</b>          | <b>R751616</b> |                     |        |           |          |     |        |           |
| <b>WG864993-5 CRM</b> |                | <b>VA-NRC-TORT2</b> |        |           |          |     |        |           |
| Copper (Cu)-Total     |                |                     | 87     |           | %        |     | 80-108 | 03-NOV-08 |
| Lead (Pb)-Total       |                |                     | 137    |           | %        |     | 67-141 | 03-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 89     |           | %        |     | 81-110 | 03-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | 110    |           | %        |     | 87-115 | 03-NOV-08 |
| Nickel (Ni)-Total     |                |                     | 88     |           | %        |     | 75-109 | 03-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 83     |           | %        |     | 77-111 | 03-NOV-08 |
| Vanadium (V)-Total    |                |                     | 105    |           | %        |     | 90-125 | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 99     |           | %        |     | 84-118 | 03-NOV-08 |
| <b>WG864993-6 CRM</b> |                | <b>VA-NIST-1547</b> |        |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | 87     |           | %        |     | 69-112 | 03-NOV-08 |
| Barium (Ba)-Total     |                |                     | 88     |           | %        |     | 83-119 | 03-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 95     |           | %        |     | 87-114 | 03-NOV-08 |
| Chromium (Cr)-Total   |                |                     | 88     |           | %        |     | 48-89  | 03-NOV-08 |
| Copper (Cu)-Total     |                |                     | 96     |           | %        |     | 86-115 | 03-NOV-08 |
| Lead (Pb)-Total       |                |                     | 96     |           | %        |     | 79-120 | 03-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 91     |           | %        |     | 65-135 | 03-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 93     |           | %        |     | 86-117 | 03-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 97     |           | %        |     | 93-125 | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 101    |           | %        |     | 84-120 | 03-NOV-08 |
| <b>WG864993-7 CRM</b> |                | <b>VA-NIST-1515</b> |        |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | 82     |           | %        |     | 66-109 | 03-NOV-08 |
| Barium (Ba)-Total     |                |                     | 84     | RM-L      | %        |     | 90-113 | 03-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 91     |           | %        |     | 87-116 | 03-NOV-08 |
| Copper (Cu)-Total     |                |                     | 93     |           | %        |     | 83-114 | 03-NOV-08 |
| Lead (Pb)-Total       |                |                     | 89     |           | %        |     | 70-117 | 03-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 86     |           | %        |     | 85-115 | 03-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 88     | RM-L      | %        |     | 89-116 | 03-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 91     |           | %        |     | 89-119 | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 95     |           | %        |     | 84-115 | 03-NOV-08 |
| <b>WG864993-1 MB</b>  |                |                     |        |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0   |           | mg/kg ww |     | 2      | 03-NOV-08 |
| Antimony (Sb)-Total   |                |                     | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Arsenic (As)-Total    |                |                     | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Barium (Ba)-Total     |                |                     | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |



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| Test                  | Matrix  | Reference | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|---------|-----------|---------|-----------|----------|-----|-------|-----------|
| MET-WET-MS-VA         |         | Tissue    |         |           |          |     |       |           |
| Batch                 | R751616 |           |         |           |          |     |       |           |
| WG864993-1            | MB      |           |         |           |          |     |       |           |
| Beryllium (Be)-Total  |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Bismuth (Bi)-Total    |         |           | <0.030  |           | mg/kg ww |     | 0.03  | 03-NOV-08 |
| Cadmium (Cd)-Total    |         |           | <0.0050 |           | mg/kg ww |     | 0.005 | 03-NOV-08 |
| Calcium (Ca)-Total    |         |           | <2.0    |           | mg/kg ww |     | 2     | 03-NOV-08 |
| Chromium (Cr)-Total   |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Cobalt (Co)-Total     |         |           | <0.020  |           | mg/kg ww |     | 0.02  | 03-NOV-08 |
| Copper (Cu)-Total     |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Lead (Pb)-Total       |         |           | <0.020  |           | mg/kg ww |     | 0.02  | 03-NOV-08 |
| Lithium (Li)-Total    |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Magnesium (Mg)-Total  |         |           | <1.0    |           | mg/kg ww |     | 1     | 03-NOV-08 |
| Manganese (Mn)-Total  |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Molybdenum (Mo)-Total |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Nickel (Ni)-Total     |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Strontium (Sr)-Total  |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Thallium (Tl)-Total   |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Tin (Sn)-Total        |         |           | <0.050  |           | mg/kg ww |     | 0.05  | 03-NOV-08 |
| Uranium (U)-Total     |         |           | <0.0020 |           | mg/kg ww |     | 0.002 | 03-NOV-08 |
| Vanadium (V)-Total    |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Zinc (Zn)-Total       |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| WG864993-2            | MB      |           |         |           |          |     |       |           |
| Aluminum (Al)-Total   |         |           | <2.0    |           | mg/kg ww |     | 2     | 03-NOV-08 |
| Antimony (Sb)-Total   |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Arsenic (As)-Total    |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Barium (Ba)-Total     |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Beryllium (Be)-Total  |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Bismuth (Bi)-Total    |         |           | <0.030  |           | mg/kg ww |     | 0.03  | 03-NOV-08 |
| Cadmium (Cd)-Total    |         |           | <0.0050 |           | mg/kg ww |     | 0.005 | 03-NOV-08 |
| Calcium (Ca)-Total    |         |           | <2.0    |           | mg/kg ww |     | 2     | 03-NOV-08 |
| Chromium (Cr)-Total   |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Cobalt (Co)-Total     |         |           | <0.020  |           | mg/kg ww |     | 0.02  | 03-NOV-08 |
| Copper (Cu)-Total     |         |           | <0.010  |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Lead (Pb)-Total       |         |           | <0.020  |           | mg/kg ww |     | 0.02  | 03-NOV-08 |
| Lithium (Li)-Total    |         |           | <0.10   |           | mg/kg ww |     | 0.1   | 03-NOV-08 |
| Magnesium (Mg)-Total  |         |           | <1.0    |           | mg/kg ww |     | 1     | 03-NOV-08 |

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| Test                  | Matrix         | Reference        | Result  | Qualifier | Units    | RPD    | Limit | Analyzed  |
|-----------------------|----------------|------------------|---------|-----------|----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>    |         |           |          |        |       |           |
| <b>Batch</b>          | <b>R751616</b> |                  |         |           |          |        |       |           |
| <b>WG864993-2</b>     | <b>MB</b>      |                  |         |           |          |        |       |           |
| Manganese (Mn)-Total  |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 03-NOV-08 |
| Molybdenum (Mo)-Total |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 03-NOV-08 |
| Nickel (Ni)-Total     |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 03-NOV-08 |
| Strontium (Sr)-Total  |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 03-NOV-08 |
| Thallium (Tl)-Total   |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 03-NOV-08 |
| Tin (Sn)-Total        |                |                  | <0.050  |           | mg/kg ww |        | 0.05  | 03-NOV-08 |
| Uranium (U)-Total     |                |                  | <0.0020 |           | mg/kg ww |        | 0.002 | 03-NOV-08 |
| Vanadium (V)-Total    |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 03-NOV-08 |
| Zinc (Zn)-Total       |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 03-NOV-08 |
| <b>Batch</b>          | <b>R751933</b> |                  |         |           |          |        |       |           |
| <b>WG864993-3</b>     | <b>DUP</b>     | <b>L680075-8</b> |         |           |          |        |       |           |
| Aluminum (Al)-Total   |                | 7.7              | 9.6     | J         | mg/kg ww | 1.9    | 16    | 04-NOV-08 |
| Antimony (Sb)-Total   |                | <0.020           | <0.020  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Arsenic (As)-Total    |                | 0.624            | 0.579   |           | mg/kg ww | 7.5    | 45    | 04-NOV-08 |
| Barium (Ba)-Total     |                | 1.87             | 1.95    |           | mg/kg ww | 3.9    | 45    | 04-NOV-08 |
| Beryllium (Be)-Total  |                | <0.20            | <0.20   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Bismuth (Bi)-Total    |                | <0.060           | <0.060  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Cadmium (Cd)-Total    |                | 0.012            | 0.013   | J         | mg/kg ww | 0.001  | 0.04  | 04-NOV-08 |
| Calcium (Ca)-Total    |                | 13100            | 13200   |           | mg/kg ww | 1.0    | 45    | 04-NOV-08 |
| Chromium (Cr)-Total   |                | 0.21             | <0.20   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Cobalt (Co)-Total     |                | 0.069            | 0.071   | J         | mg/kg ww | 0.002  | 0.16  | 04-NOV-08 |
| Copper (Cu)-Total     |                | 0.433            | 0.423   |           | mg/kg ww | 2.3    | 45    | 04-NOV-08 |
| Lead (Pb)-Total       |                | <0.040           | <0.040  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Lithium (Li)-Total    |                | <0.20            | <0.20   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Magnesium (Mg)-Total  |                | 453              | 438     |           | mg/kg ww | 3.3    | 45    | 04-NOV-08 |
| Manganese (Mn)-Total  |                | 5.71             | 5.86    |           | mg/kg ww | 2.5    | 45    | 04-NOV-08 |
| Molybdenum (Mo)-Total |                | 0.024            | 0.025   | J         | mg/kg ww | 0.001  | 0.08  | 04-NOV-08 |
| Nickel (Ni)-Total     |                | <0.20            | <0.20   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Strontium (Sr)-Total  |                | 15.0             | 15.3    |           | mg/kg ww | 1.9    | 45    | 04-NOV-08 |
| Thallium (Tl)-Total   |                | <0.020           | <0.020  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Tin (Sn)-Total        |                | <0.10            | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Uranium (U)-Total     |                | 0.0058           | 0.0069  | J         | mg/kg ww | 0.0011 | 0.016 | 04-NOV-08 |
| Vanadium (V)-Total    |                | <0.20            | <0.20   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-NOV-08 |
| Zinc (Zn)-Total       |                | 28.4             | 27.7    |           | mg/kg ww | 2.3    | 45    | 04-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R752527</b> |                     |        |           |       |     |        |           |
| <b>WG865914-5 CRM</b> |                | <b>VA-NIST-2976</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 102    |           | %     |     | 52-141 | 05-NOV-08 |
| Arsenic (As)-Total    |                |                     | 113    |           | %     |     | 83-137 | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 110    |           | %     |     | 76-124 | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 94     |           | %     |     | 53-137 | 05-NOV-08 |
| Cobalt (Co)-Total     |                |                     | 108    |           | %     |     | 73-133 | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 102    |           | %     |     | 80-119 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 108    |           | %     |     | 62-144 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 88     |           | %     |     | 56-118 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 111    |           | %     |     | 65-160 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 102    |           | %     |     | 80-128 | 05-NOV-08 |
| <b>WG865914-6 CRM</b> |                | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Arsenic (As)-Total    |                |                     | 103    |           | %     |     | 83-108 | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 105    |           | %     |     | 91-122 | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 92     |           | %     |     | 80-108 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 104    |           | %     |     | 67-141 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 97     |           | %     |     | 81-110 | 05-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | 108    |           | %     |     | 87-115 | 05-NOV-08 |
| Nickel (Ni)-Total     |                |                     | 94     |           | %     |     | 75-109 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 82     |           | %     |     | 77-111 | 05-NOV-08 |
| Vanadium (V)-Total    |                |                     | 114    |           | %     |     | 90-125 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 98     |           | %     |     | 84-118 | 05-NOV-08 |
| <b>WG865914-7 CRM</b> |                | <b>VA-NIST-1515</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 86     |           | %     |     | 66-109 | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | 86     | RM-L      | %     |     | 90-113 | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 99     |           | %     |     | 87-116 | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 102    |           | %     |     | 83-114 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 98     |           | %     |     | 70-117 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 93     |           | %     |     | 85-115 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 114    |           | %     |     | 89-116 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 95     |           | %     |     | 89-119 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 98     |           | %     |     | 84-115 | 05-NOV-08 |
| <b>WG865914-8 CRM</b> |                | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 90     |           | %     |     | 69-112 | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | 90     |           | %     |     | 83-119 | 05-NOV-08 |

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|----------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |          |     |        |           |
| <b>Batch</b>          | <b>R752527</b> |                     |         |           |          |     |        |           |
| <b>WG865914-8</b>     | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |          |     |        |           |
| Calcium (Ca)-Total    |                |                     | 104     |           | %        |     | 87-114 | 05-NOV-08 |
| Chromium (Cr)-Total   |                |                     | 80      |           | %        |     | 48-89  | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | 106     |           | %        |     | 86-115 | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | 102     |           | %        |     | 79-120 | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 98      |           | %        |     | 65-135 | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 120     | RM-H      | %        |     | 86-117 | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 99      |           | %        |     | 93-125 | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 105     |           | %        |     | 84-120 | 05-NOV-08 |
| <b>WG865914-1</b>     | <b>MB</b>      |                     |         |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0    |           | mg/kg ww |     | 2      | 05-NOV-08 |
| Antimony (Sb)-Total   |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Arsenic (As)-Total    |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Barium (Ba)-Total     |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Beryllium (Be)-Total  |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |
| Bismuth (Bi)-Total    |                |                     | <0.030  |           | mg/kg ww |     | 0.03   | 05-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | <0.0050 |           | mg/kg ww |     | 0.005  | 05-NOV-08 |
| Calcium (Ca)-Total    |                |                     | <2.0    |           | mg/kg ww |     | 2      | 05-NOV-08 |
| Chromium (Cr)-Total   |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |
| Cobalt (Co)-Total     |                |                     | <0.020  |           | mg/kg ww |     | 0.02   | 05-NOV-08 |
| Copper (Cu)-Total     |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Lead (Pb)-Total       |                |                     | <0.020  |           | mg/kg ww |     | 0.02   | 05-NOV-08 |
| Lithium (Li)-Total    |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | <1.0    |           | mg/kg ww |     | 1      | 05-NOV-08 |
| Manganese (Mn)-Total  |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Nickel (Ni)-Total     |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |
| Strontium (Sr)-Total  |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Thallium (Tl)-Total   |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 05-NOV-08 |
| Tin (Sn)-Total        |                |                     | <0.050  |           | mg/kg ww |     | 0.05   | 05-NOV-08 |
| Uranium (U)-Total     |                |                     | <0.0020 |           | mg/kg ww |     | 0.002  | 05-NOV-08 |
| Vanadium (V)-Total    |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |
| Zinc (Zn)-Total       |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 05-NOV-08 |

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| Test                  | Matrix  | Reference  | Result | Qualifier | Units      | RPD    | Limit | Analyzed  |
|-----------------------|---------|------------|--------|-----------|------------|--------|-------|-----------|
| MET-WET-MS-VA         |         | Tissue     |        |           |            |        |       |           |
| Batch                 | R753104 |            |        |           |            |        |       |           |
| WG865914-4            | DUP     | L680075-15 |        |           |            |        |       |           |
| Aluminum (Al)-Total   |         | 38.5       | 35.4   | J         | mg/kg wwft | 3.1    | 24    | 06-NOV-08 |
| Antimony (Sb)-Total   |         | <0.030     | <0.030 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Arsenic (As)-Total    |         | 1.45       | 1.31   |           | mg/kg wwft | 10     | 45    | 06-NOV-08 |
| Barium (Ba)-Total     |         | 3.40       | 3.10   |           | mg/kg wwft | 9.0    | 45    | 06-NOV-08 |
| Beryllium (Be)-Total  |         | <0.30      | <0.30  | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Bismuth (Bi)-Total    |         | <0.090     | <0.090 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Cadmium (Cd)-Total    |         | <0.015     | <0.015 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Calcium (Ca)-Total    |         | 22200      | 20000  |           | mg/kg wwft | 10     | 45    | 06-NOV-08 |
| Chromium (Cr)-Total   |         | 0.45       | 0.39   | J         | mg/kg wwft | 0.06   | 1.2   | 06-NOV-08 |
| Cobalt (Co)-Total     |         | <0.060     | <0.060 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Copper (Cu)-Total     |         | 0.488      | 0.433  |           | mg/kg wwft | 12     | 45    | 06-NOV-08 |
| Lead (Pb)-Total       |         | <0.060     | <0.060 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Lithium (Li)-Total    |         | <0.30      | <0.30  | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Magnesium (Mg)-Total  |         | 651        | 594    |           | mg/kg wwft | 9.1    | 45    | 06-NOV-08 |
| Manganese (Mn)-Total  |         | 9.85       | 8.91   |           | mg/kg wwft | 10     | 45    | 06-NOV-08 |
| Molybdenum (Mo)-Total |         | 0.053      | 0.051  | J         | mg/kg wwft | 0.002  | 0.12  | 06-NOV-08 |
| Nickel (Ni)-Total     |         | <0.30      | <0.30  | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Strontium (Sr)-Total  |         | 38.9       | 35.7   |           | mg/kg wwft | 8.7    | 45    | 06-NOV-08 |
| Thallium (Tl)-Total   |         | <0.030     | <0.030 | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Tin (Sn)-Total        |         | <0.15      | <0.15  | RPD-NA    | mg/kg wwft | N/A    | 45    | 06-NOV-08 |
| Uranium (U)-Total     |         | 0.0100     | 0.0086 | J         | mg/kg wwft | 0.0013 | 0.024 | 06-NOV-08 |
| Vanadium (V)-Total    |         | 0.44       | 0.39   | J         | mg/kg wwft | 0.05   | 1.2   | 06-NOV-08 |
| Zinc (Zn)-Total       |         | 33.2       | 30.0   |           | mg/kg wwft | 10     | 45    | 06-NOV-08 |
| MOISTURE-TISS-VA      |         | Tissue     |        |           |            |        |       |           |
| Batch                 | R751381 |            |        |           |            |        |       |           |
| WG864715-1            | DUP     | L680075-8  |        |           |            |        |       |           |
| % Moisture            |         | 54.4       | 55.1   |           | %          | 1.4    | 30    | 04-NOV-08 |
| Batch                 | R752116 |            |        |           |            |        |       |           |
| WG865888-1            | DUP     | L680075-15 |        |           |            |        |       |           |
| % Moisture            |         | 70.4       | 69.2   |           | %          | 1.6    | 30    | 05-NOV-08 |
| OCP1-TDRY-SOX-ECD-VA  |         | Tissue     |        |           |            |        |       |           |

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| Test                               | Matrix         | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-----------|--------|-----------|-------|-----|-------|-----------|
| <b>OCP1-TDRY-SOX-ECD-VA Tissue</b> |                |           |        |           |       |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |           |        |           |       |     |       |           |
| <b>WG858587-1 MB</b>               |                |           |        |           |       |     |       |           |
| alpha-BHC                          |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Lindane (gamma - BHC)              |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| beta-BHC                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| delta-BHC                          |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Heptachlor                         |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Aldrin                             |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Oxychlordane                       |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 2,4'-DDE                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Heptachlor Epoxide                 |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| trans-Chlordane (gamma)            |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| trans-Nonachlor                    |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| cis-Chlordane (alpha)              |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 4,4'-DDE                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Endosulfan I                       |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 2,4'-DDD                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Dieldrin                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 2,4'-DDT                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Endrin                             |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| cis-Nonachlor                      |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 4,4'-DDD                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Endosulfan II                      |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| 4,4'-DDT                           |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Methoxychlor                       |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Mirex                              |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |
| Endosulfan Sulfate                 |                |           | <0.050 |           | mg/kg |     | 0.05  | 06-NOV-08 |

## OCP1-TWET-SOX-ECD-VA Tissue

Batch R751284

WG858587-4 DUP

L680075-1

|                       |        |        |        |           |     |    |           |
|-----------------------|--------|--------|--------|-----------|-----|----|-----------|
| alpha-BHC             | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |
| Lindane (gamma - BHC) | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |
| beta-BHC              | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |
| delta-BHC             | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |
| Heptachlor            | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |
| Aldrin                | <0.010 | <0.010 | RPD-NA | mg/kg wwt | N/A | 39 | 03-NOV-08 |

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| Test                               | Matrix         | Reference        | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|------------------------------------|----------------|------------------|--------|-----------|-----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                  |        |           |           |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                  |        |           |           |     |       |           |
| <b>WG858587-4</b>                  | <b>DUP</b>     | <b>L680075-1</b> |        |           |           |     |       |           |
| Aldrin                             |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Oxychlordane                       |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 2,4'-DDE                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Heptachlor Epoxide                 |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| trans-Chlordane (gamma)            |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| trans-Nonachlor                    |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| cis-Chlordane (alpha)              |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 4,4'-DDE                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Endosulfan I                       |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 2,4'-DDD                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Dieldrin                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 2,4'-DDT                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Endrin                             |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| cis-Nonachlor                      |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 4,4'-DDD                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Endosulfan II                      |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| 4,4'-DDT                           |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Methoxychlor                       |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Mirex                              |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| Endosulfan Sulfate                 |                | <0.010           | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| <b>WG858587-1</b>                  | <b>MB</b>      |                  |        |           |           |     |       |           |
| alpha-BHC                          |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| Lindane (gamma - BHC)              |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| beta-BHC                           |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| delta-BHC                          |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| Heptachlor                         |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| Aldrin                             |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| Oxychlordane                       |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| 2,4'-DDE                           |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| Heptachlor Epoxide                 |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| trans-Chlordane (gamma)            |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| trans-Nonachlor                    |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| cis-Chlordane (alpha)              |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |
| 4,4'-DDE                           |                |                  | <0.010 |           | mg/kg wwt |     | 0.01  | 03-NOV-08 |

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| Test                               | Matrix         | Reference        | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|----------------|------------------|--------|-----------|----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                  |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751284</b> |                  |        |           |          |     |       |           |
| <b>WG858587-1 MB</b>               |                |                  |        |           |          |     |       |           |
| Endosulfan I                       |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 2,4'-DDD                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Dieldrin                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 2,4'-DDT                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endrin                             |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| cis-Nonachlor                      |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 4,4'-DDD                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endosulfan II                      |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| 4,4'-DDT                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Methoxychlor                       |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Mirex                              |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| Endosulfan Sulfate                 |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 03-NOV-08 |
| <b>PAH-T-DRY-SOX-MS-VA Tissue</b>  |                |                  |        |           |          |     |       |           |
| <b>Batch</b>                       | <b>R751210</b> |                  |        |           |          |     |       |           |
| <b>WG858587-4 DUP</b>              |                | <b>L680075-1</b> |        |           |          |     |       |           |
| Acenaphthene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Acenaphthylene                     |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Anthracene                         |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Benz(a)anthracene                  |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Benzo(a)pyrene                     |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Benzo(b)fluoranthene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Benzo(g,h,i)perylene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Benzo(k)fluoranthene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Chrysene                           |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Dibenz(a,h)anthracene              |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Fluoranthene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Fluorene                           |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Indeno(1,2,3-c,d)pyrene            |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Naphthalene                        |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Phenanthrene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| Pyrene                             |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 05-NOV-08 |
| <b>WG858587-1 MB</b>               |                |                  |        |           |          |     |       |           |
| Acenaphthene                       |                |                  | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Acenaphthylene                     |                |                  | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |



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| Test                    | Matrix  | Reference | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|-------------------------|---------|-----------|--------|-----------|----------|-----|-------|-----------|
| PAH-T-DRY-SOX-MS-VA     | Tissue  |           |        |           |          |     |       |           |
| Batch                   | R751210 |           |        |           |          |     |       |           |
| WG858587-1              | MB      |           |        |           |          |     |       |           |
| Anthracene              |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Benz(a)anthracene       |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Benzo(a)pyrene          |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Benzo(b)fluoranthene    |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Benzo(g,h,i)perylene    |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Benzo(k)fluoranthene    |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Chrysene                |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Dibenz(a,h)anthracene   |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Fluoranthene            |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Fluorene                |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Naphthalene             |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Phenanthrene            |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| Pyrene                  |         |           | <0.050 |           | mg/kg    |     | 0.05  | 05-NOV-08 |
| PAH-T-WET-SOX-MS-VA     | Tissue  |           |        |           |          |     |       |           |
| Batch                   | R751210 |           |        |           |          |     |       |           |
| WG858587-4              | DUP     | L680075-1 |        |           |          |     |       |           |
| Acenaphthene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Acenaphthylene          |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Anthracene              |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Benz(a)anthracene       |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Benzo(a)pyrene          |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Benzo(b)fluoranthene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Benzo(g,h,i)perylene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Benzo(k)fluoranthene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Chrysene                |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Dibenz(a,h)anthracene   |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Fluoranthene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Fluorene                |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Indeno(1,2,3-c,d)pyrene |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Naphthalene             |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Phenanthrene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| Pyrene                  |         | <0.010    | <0.010 | RPD-NA    | mg/kg ww | N/A | 39    | 03-NOV-08 |
| WG858587-2              | LCS     |           |        |           |          |     |       |           |

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| Test                              | Matrix | Reference | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------------------|--------|-----------|--------|-----------|----------|-----|--------|-----------|
| <b>PAH-T-WET-SOX-MS-VA Tissue</b> |        |           |        |           |          |     |        |           |
| <b>Batch R751210</b>              |        |           |        |           |          |     |        |           |
| <b>WG858587-2 LCS</b>             |        |           |        |           |          |     |        |           |
| Acenaphthene                      |        |           | 84     |           | %        |     | 55-145 | 03-NOV-08 |
| Acenaphthylene                    |        |           | 68     |           | %        |     | 55-145 | 03-NOV-08 |
| Anthracene                        |        |           | 81     |           | %        |     | 55-145 | 03-NOV-08 |
| Benz(a)anthracene                 |        |           | 83     |           | %        |     | 55-145 | 03-NOV-08 |
| Benzo(a)pyrene                    |        |           | 84     |           | %        |     | 55-145 | 03-NOV-08 |
| Benzo(b)fluoranthene              |        |           | 87     |           | %        |     | 55-145 | 03-NOV-08 |
| Benzo(g,h,i)perylene              |        |           | 78     |           | %        |     | 55-145 | 03-NOV-08 |
| Benzo(k)fluoranthene              |        |           | 87     |           | %        |     | 55-145 | 03-NOV-08 |
| Chrysene                          |        |           | 84     |           | %        |     | 55-145 | 03-NOV-08 |
| Dibenz(a,h)anthracene             |        |           | 82     |           | %        |     | 55-145 | 03-NOV-08 |
| Fluoranthene                      |        |           | 83     |           | %        |     | 55-145 | 03-NOV-08 |
| Fluorene                          |        |           | 82     |           | %        |     | 55-145 | 03-NOV-08 |
| Indeno(1,2,3-c,d)pyrene           |        |           | 83     |           | %        |     | 55-145 | 03-NOV-08 |
| Naphthalene                       |        |           | 81     |           | %        |     | 55-145 | 03-NOV-08 |
| Phenanthrene                      |        |           | 78     |           | %        |     | 55-145 | 03-NOV-08 |
| Pyrene                            |        |           | 83     |           | %        |     | 55-145 | 03-NOV-08 |
| <b>WG858587-1 MB</b>              |        |           |        |           |          |     |        |           |
| Acenaphthene                      |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Acenaphthylene                    |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Anthracene                        |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Benz(a)anthracene                 |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Benzo(a)pyrene                    |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Benzo(b)fluoranthene              |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Benzo(g,h,i)perylene              |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Benzo(k)fluoranthene              |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Chrysene                          |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Dibenz(a,h)anthracene             |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Fluoranthene                      |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Fluorene                          |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Indeno(1,2,3-c,d)pyrene           |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Naphthalene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Phenanthrene                      |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |
| Pyrene                            |        |           | <0.010 |           | mg/kg ww |     | 0.01   | 03-NOV-08 |

**PCB-T-DRY-SOX-ECD-VA Tissue**

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| Test                               | Matrix | Reference | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|------------------------------------|--------|-----------|--------|-----------|-----------|-----|-------|-----------|
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |        |           |        |           |           |     |       |           |
| <b>Batch R751284</b>               |        |           |        |           |           |     |       |           |
| <b>WG858587-1 MB</b>               |        |           |        |           |           |     |       |           |
| Total Polychlorinated Biphenyls    |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1016                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1221                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1232                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1242                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1248                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1254                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1260                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1262                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| PCB-1268                           |        |           | <0.25  |           | mg/kg     |     | 0.25  | 06-NOV-08 |
| <b>PCB-T-WET-SOX-ECD-VA Tissue</b> |        |           |        |           |           |     |       |           |
| <b>Batch R751284</b>               |        |           |        |           |           |     |       |           |
| <b>WG858587-4 DUP L680075-1</b>    |        |           |        |           |           |     |       |           |
| Total Polychlorinated Biphenyls    |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1016                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1221                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1232                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1242                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1248                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1254                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1260                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1262                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| PCB-1268                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg wwt | N/A | 39    | 03-NOV-08 |
| <b>WG858587-1 MB</b>               |        |           |        |           |           |     |       |           |
| Total Polychlorinated Biphenyls    |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1016                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1221                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1232                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1242                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1248                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1254                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1260                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1262                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |
| PCB-1268                           |        |           | <0.050 |           | mg/kg wwt |     | 0.05  | 03-NOV-08 |

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| Test                   | Matrix         | Reference           | Result | Qualifier | Units    | RPD  | Limit  | Analyzed  |
|------------------------|----------------|---------------------|--------|-----------|----------|------|--------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |          |      |        |           |
| <b>Batch</b>           | <b>R751929</b> |                     |        |           |          |      |        |           |
| <b>WG864993-5 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | 95     |           | %        |      | 83-112 | 04-NOV-08 |
| <b>WG864993-7 CRM</b>  |                | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG864993-3 DUP</b>  |                | <b>L680075-8</b>    |        |           |          |      |        |           |
| Selenium (Se)-Total    |                | 1.41                | 1.38   | J         | mg/kg    | 0.03 | 0.8    | 04-NOV-08 |
| <b>WG864993-1 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 04-NOV-08 |
| <b>WG864993-2 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 04-NOV-08 |
| <b>Batch</b>           | <b>R753153</b> |                     |        |           |          |      |        |           |
| <b>WG865914-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | 97     |           | %        |      | 83-112 | 06-NOV-08 |
| <b>WG865914-7 CRM</b>  |                | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG865914-8 CRM</b>  |                | <b>VA-NIST-1547</b> |        |           |          |      |        |           |
| <b>WG865914-1 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 06-NOV-08 |
| <b>SE-WET-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |          |      |        |           |
| <b>Batch</b>           | <b>R751929</b> |                     |        |           |          |      |        |           |
| <b>WG864993-5 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | 95     |           | %        |      | 83-112 | 04-NOV-08 |
| <b>WG864993-7 CRM</b>  |                | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG864993-3 DUP</b>  |                | <b>L680075-8</b>    |        |           |          |      |        |           |
| Selenium (Se)-Total    |                | 0.644               | 0.630  |           | mg/kg ww | 2.1  | 45     | 04-NOV-08 |
| <b>WG864993-1 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg ww |      | 0.02   | 04-NOV-08 |
| <b>WG864993-2 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg ww |      | 0.02   | 04-NOV-08 |
| <b>Batch</b>           | <b>R753156</b> |                     |        |           |          |      |        |           |
| <b>WG865914-6 CRM</b>  |                | <b>VA-NRC-TORT2</b> |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | 97     |           | %        |      | 83-112 | 06-NOV-08 |
| <b>WG865914-7 CRM</b>  |                | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG865914-8 CRM</b>  |                | <b>VA-NIST-1547</b> |        |           |          |      |        |           |
| <b>WG865914-1 MB</b>   |                |                     |        |           |          |      |        |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg ww |      | 0.02   | 06-NOV-08 |

## ALS Laboratory Group Quality Control Report

Workorder: L680075

Report Date: 07-NOV-08

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**Legend:**

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

**Sample Parameter Qualifier Definitions:**

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| Qualifier | Description                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                                                                                          |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.                                                                 |
| RM-L      | Reference Material recovery was below ALS DQO. Lab Control Sample and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                                                                                          |



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
ATTN: ADRIAN DE BRUYN  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Report Date: 06-MAY-09 11:45 (MT)  
Version: FINAL REV. 2

Lab Work Order #: **L685670**

Date Received: **22-SEP-08**

Project P.O. #:  
Job Reference: PANAMA  
Legal Site Desc:  
CofC Numbers:

**Other Information:**

**Comments:** January 28, 2009 - Detection limits were increased for some Pesticides, Polycyclic Aromatic Hydrocarbons, and PCBs due to high moisture contents and required dilutions.  
May 6, 2009 - Boron data has been added for soil samples, and Boron and Silver data has been added for tissue samples in this report. All other data remains unchanged.

Amber Springer  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                      | L685670-9      | L685670-10     | L685670-13      | L685670-14      | L685670-15      |
|-----------------------------------------------------------------------|--------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|
|                                                                       |                                      | 25-AUG-08      | 27-AUG-08      | 27-AUG-08       | 28-AUG-08       | 29-AUG-08       |
|                                                                       |                                      | ARROZ#1 SOIL M | ARROZ#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M |
| Grouping                                                              | Analyte                              |                |                |                 |                 |                 |
| <b>SOIL</b>                                                           |                                      |                |                |                 |                 |                 |
| <b>Physical Tests</b>                                                 | % Moisture (%)                       |                |                |                 |                 |                 |
|                                                                       | pH (pH)                              | 5.14           | 5.64           | 5.88            | 5.32            | 5.74            |
| <b>Metals</b>                                                         | Antimony (Sb) (mg/kg)                | <10            | <10            | <10             | <10             | <10             |
|                                                                       | Arsenic (As) (mg/kg)                 | <5.0           | <5.0           | 5.3             | <5.0            | <5.0            |
|                                                                       | Barium (Ba) (mg/kg)                  | 89.0           | 139            | 251             | 143             | 5.4             |
|                                                                       | Beryllium (Be) (mg/kg)               | 0.90           | 0.99           | 1.29            | 1.17            | <0.50           |
|                                                                       | Boron (B) (mg/kg)                    | <10            | <10            | <10             | <10             | <10             |
|                                                                       | Cadmium (Cd) (mg/kg)                 | <0.50          | <0.50          | <0.50           | <0.50           | <0.50           |
|                                                                       | Chromium (Cr) (mg/kg)                | 32.9           | 27.5           | 35.1            | 16.7            | 5.1             |
|                                                                       | Cobalt (Co) (mg/kg)                  | 20.5           | 17.1           | 28.1            | 20.6            | <2.0            |
|                                                                       | Copper (Cu) (mg/kg)                  | 114            | 52.3           | 69.9            | 80.1            | 5.9             |
|                                                                       | Lead (Pb) (mg/kg)                    | <30            | <30            | <30             | <30             | 111             |
|                                                                       | Mercury (Hg) (mg/kg)                 | 0.0930         | 0.0456         | 0.0773          | 0.0729          | 0.0658          |
|                                                                       | Molybdenum (Mo) (mg/kg)              | <4.0           | <4.0           | <4.0            | <4.0            | <4.0            |
|                                                                       | Nickel (Ni) (mg/kg)                  | 6.3            | 9.0            | 14.2            | <5.0            | <5.0            |
|                                                                       | Selenium (Se) (mg/kg)                | <2.0           | <2.0           | <2.0            | <2.0            | <2.0            |
|                                                                       | Silver (Ag) (mg/kg)                  | <2.0           | <2.0           | <2.0            | <2.0            | <2.0            |
|                                                                       | Thallium (Tl) (mg/kg)                | <1.0           | <1.0           | <1.0            | <1.0            | <1.0            |
|                                                                       | Tin (Sn) (mg/kg)                     | <5.0           | <5.0           | <5.0            | <5.0            | <5.0            |
|                                                                       | Vanadium (V) (mg/kg)                 | 147            | 148            | 171             | 163             | 32.2            |
|                                                                       | Zinc (Zn) (mg/kg)                    | 86.5           | 72.3           | 163             | 100             | 14.2            |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)                 |                |                |                 |                 |                 |
|                                                                       | Acenaphthylene (mg/kg)               |                |                |                 |                 |                 |
|                                                                       | Anthracene (mg/kg)                   |                |                |                 |                 |                 |
|                                                                       | Benz(a)anthracene (mg/kg)            |                |                |                 |                 |                 |
|                                                                       | Benzo(a)pyrene (mg/kg)               |                |                |                 |                 |                 |
|                                                                       | Benzo(b)fluoranthene (mg/kg)         |                |                |                 |                 |                 |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)         |                |                |                 |                 |                 |
|                                                                       | Benzo(k)fluoranthene (mg/kg)         |                |                |                 |                 |                 |
|                                                                       | Chrysene (mg/kg)                     |                |                |                 |                 |                 |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)        |                |                |                 |                 |                 |
|                                                                       | Fluoranthene (mg/kg)                 |                |                |                 |                 |                 |
|                                                                       | Fluorene (mg/kg)                     |                |                |                 |                 |                 |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)      |                |                |                 |                 |                 |
|                                                                       | 2-Methylnaphthalene (mg/kg)          |                |                |                 |                 |                 |
|                                                                       | Naphthalene (mg/kg)                  |                |                |                 |                 |                 |
|                                                                       | Phenanthrene (mg/kg)                 |                |                |                 |                 |                 |
|                                                                       | Pyrene (mg/kg)                       |                |                |                 |                 |                 |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%) |                |                |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                      | L685670-18    | L685670-20    | L685670-43    | L685670-59     | L685670-74    |
|-----------------------------------------------------------------------|--------------------------------------|---------------|---------------|---------------|----------------|---------------|
|                                                                       |                                      | 26-AUG-08     | 29-AUG-08     | 29-AUG-08     | 25-AUG-08      | 26-AUG-08     |
|                                                                       |                                      | YUKA#1 SOIL M | YUKA#1 SOIL M | YUCA#1 SOIL O | ARROZ#1 SOIL O | YUCA#1 SOIL O |
| Grouping                                                              | Analyte                              |               |               |               |                |               |
| <b>SOIL</b>                                                           |                                      |               |               |               |                |               |
| <b>Physical Tests</b>                                                 | % Moisture (%)                       |               |               | 16.3          | 39.8           | 49.3          |
|                                                                       | pH (pH)                              | 4.87          | 5.65          |               |                |               |
| <b>Metals</b>                                                         | Antimony (Sb) (mg/kg)                | <10           | <10           |               |                |               |
|                                                                       | Arsenic (As) (mg/kg)                 | <5.0          | <5.0          |               |                |               |
|                                                                       | Barium (Ba) (mg/kg)                  | 56.8          | 5.8           |               |                |               |
|                                                                       | Beryllium (Be) (mg/kg)               | 1.33          | <0.50         |               |                |               |
|                                                                       | Boron (B) (mg/kg)                    | <10           | <10           |               |                |               |
|                                                                       | Cadmium (Cd) (mg/kg)                 | <0.50         | <0.50         |               |                |               |
|                                                                       | Chromium (Cr) (mg/kg)                | 7.2           | <2.0          |               |                |               |
|                                                                       | Cobalt (Co) (mg/kg)                  | 25.4          | <2.0          |               |                |               |
|                                                                       | Copper (Cu) (mg/kg)                  | 74.6          | 2.6           |               |                |               |
|                                                                       | Lead (Pb) (mg/kg)                    | <30           | <30           |               |                |               |
|                                                                       | Mercury (Hg) (mg/kg)                 | 0.151         | 0.0431        |               |                |               |
|                                                                       | Molybdenum (Mo) (mg/kg)              | <4.0          | <4.0          |               |                |               |
|                                                                       | Nickel (Ni) (mg/kg)                  | <5.0          | <5.0          |               |                |               |
|                                                                       | Selenium (Se) (mg/kg)                | <2.0          | <2.0          |               |                |               |
|                                                                       | Silver (Ag) (mg/kg)                  | <2.0          | <2.0          |               |                |               |
|                                                                       | Thallium (Tl) (mg/kg)                | <1.0          | <1.0          |               |                |               |
|                                                                       | Tin (Sn) (mg/kg)                     | <5.0          | <5.0          |               |                |               |
|                                                                       | Vanadium (V) (mg/kg)                 | 255           | 12.1          |               |                |               |
|                                                                       | Zinc (Zn) (mg/kg)                    | 32.8          | 121           |               |                |               |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)                 |               |               | <0.040        | <0.040         | <0.040        |
|                                                                       | Acenaphthylene (mg/kg)               |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Anthracene (mg/kg)                   |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Benz(a)anthracene (mg/kg)            |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Benzo(a)pyrene (mg/kg)               |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Benzo(b)fluoranthene (mg/kg)         |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)         |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Benzo(k)fluoranthene (mg/kg)         |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Chrysene (mg/kg)                     |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)        |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Fluoranthene (mg/kg)                 |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Fluorene (mg/kg)                     |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)      |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | 2-Methylnaphthalene (mg/kg)          |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Naphthalene (mg/kg)                  |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Phenanthrene (mg/kg)                 |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Pyrene (mg/kg)                       |               |               | <0.050        | <0.050         | <0.050        |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%) |               |               | 92            | 94             | 94            |



# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                      |                                                                                                          |               |  |  |  |  |
|-----------------------------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------|---------------|--|--|--|--|
|                                         |                                      | <b>Sample ID</b><br><b>Description</b><br><b>Sampled Date</b><br><b>Sampled Time</b><br><b>Client ID</b> | L685670-77    |  |  |  |  |
|                                         |                                      |                                                                                                          | 27-AUG-08     |  |  |  |  |
|                                         |                                      |                                                                                                          | RICE#1 SOIL O |  |  |  |  |
| <b>Grouping</b>                         | <b>Analyte</b>                       |                                                                                                          |               |  |  |  |  |
| <b>SOIL</b>                             |                                      |                                                                                                          |               |  |  |  |  |
| <b>Physical Tests</b>                   | % Moisture (%)                       |                                                                                                          | 44.0          |  |  |  |  |
|                                         | pH (pH)                              |                                                                                                          |               |  |  |  |  |
| <b>Metals</b>                           | Antimony (Sb) (mg/kg)                |                                                                                                          |               |  |  |  |  |
|                                         | Arsenic (As) (mg/kg)                 |                                                                                                          |               |  |  |  |  |
|                                         | Barium (Ba) (mg/kg)                  |                                                                                                          |               |  |  |  |  |
|                                         | Beryllium (Be) (mg/kg)               |                                                                                                          |               |  |  |  |  |
|                                         | Boron (B) (mg/kg)                    |                                                                                                          |               |  |  |  |  |
|                                         | Cadmium (Cd) (mg/kg)                 |                                                                                                          |               |  |  |  |  |
|                                         | Chromium (Cr) (mg/kg)                |                                                                                                          |               |  |  |  |  |
|                                         | Cobalt (Co) (mg/kg)                  |                                                                                                          |               |  |  |  |  |
|                                         | Copper (Cu) (mg/kg)                  |                                                                                                          |               |  |  |  |  |
|                                         | Lead (Pb) (mg/kg)                    |                                                                                                          |               |  |  |  |  |
|                                         | Mercury (Hg) (mg/kg)                 |                                                                                                          |               |  |  |  |  |
|                                         | Molybdenum (Mo) (mg/kg)              |                                                                                                          |               |  |  |  |  |
|                                         | Nickel (Ni) (mg/kg)                  |                                                                                                          |               |  |  |  |  |
|                                         | Selenium (Se) (mg/kg)                |                                                                                                          |               |  |  |  |  |
|                                         | Silver (Ag) (mg/kg)                  |                                                                                                          |               |  |  |  |  |
|                                         | Thallium (Tl) (mg/kg)                |                                                                                                          |               |  |  |  |  |
|                                         | Tin (Sn) (mg/kg)                     |                                                                                                          |               |  |  |  |  |
|                                         | Vanadium (V) (mg/kg)                 |                                                                                                          |               |  |  |  |  |
|                                         | Zinc (Zn) (mg/kg)                    |                                                                                                          |               |  |  |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Acenaphthene (mg/kg)                 |                                                                                                          | <0.040        |  |  |  |  |
|                                         | Acenaphthylene (mg/kg)               |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Anthracene (mg/kg)                   |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Benz(a)anthracene (mg/kg)            |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Benzo(a)pyrene (mg/kg)               |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Benzo(b)fluoranthene (mg/kg)         |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Benzo(g,h,i)perylene (mg/kg)         |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Benzo(k)fluoranthene (mg/kg)         |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Chrysene (mg/kg)                     |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Dibenz(a,h)anthracene (mg/kg)        |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Fluoranthene (mg/kg)                 |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Fluorene (mg/kg)                     |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg)      |                                                                                                          | <0.050        |  |  |  |  |
|                                         | 2-Methylnaphthalene (mg/kg)          |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Naphthalene (mg/kg)                  |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Phenanthrene (mg/kg)                 |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Pyrene (mg/kg)                       |                                                                                                          | <0.050        |  |  |  |  |
|                                         | Surrogate: d10-Acenaphthene (SS) (%) |                                                                                                          | 93            |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                         | L685670-9      | L685670-10     | L685670-13      | L685670-14      | L685670-15      |
|-----------------------------------------------------------------------|-----------------------------------------|----------------|----------------|-----------------|-----------------|-----------------|
|                                                                       |                                         | 25-AUG-08      | 27-AUG-08      | 27-AUG-08       | 28-AUG-08       | 29-AUG-08       |
|                                                                       |                                         | ARROZ#1 SOIL M | ARROZ#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M |
| Grouping                                                              | Analyte                                 |                |                |                 |                 |                 |
| <b>SOIL</b>                                                           |                                         |                |                |                 |                 |                 |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Surrogate: d12-Chrysene (SS) (%)        |                |                |                 |                 |                 |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)      |                |                |                 |                 |                 |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)    |                |                |                 |                 |                 |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1221 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1232 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1242 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1248 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1254 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1260 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1262 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | PCB-1268 (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg) |                |                |                 |                 |                 |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                          |                |                |                 |                 |                 |
|                                                                       | alpha-BHC (mg/kg)                       |                |                |                 |                 |                 |
|                                                                       | beta-BHC (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | Lindane (gamma - BHC) (mg/kg)           |                |                |                 |                 |                 |
|                                                                       | delta-BHC (mg/kg)                       |                |                |                 |                 |                 |
|                                                                       | cis-Chlordane (alpha) (mg/kg)           |                |                |                 |                 |                 |
|                                                                       | trans-Chlordane (gamma) (mg/kg)         |                |                |                 |                 |                 |
|                                                                       | 2,4'-DDD (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | 4,4'-DDD (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | 2,4'-DDE (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | 4,4'-DDE (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | 2,4'-DDT (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | 4,4'-DDT (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | Dieldrin (mg/kg)                        |                |                |                 |                 |                 |
|                                                                       | Endosulfan I (mg/kg)                    |                |                |                 |                 |                 |
|                                                                       | Endosulfan II (mg/kg)                   |                |                |                 |                 |                 |
|                                                                       | Endosulfan Sulfate (mg/kg)              |                |                |                 |                 |                 |
|                                                                       | Endrin (mg/kg)                          |                |                |                 |                 |                 |
|                                                                       | Heptachlor (mg/kg)                      |                |                |                 |                 |                 |
|                                                                       | Heptachlor Epoxide (mg/kg)              |                |                |                 |                 |                 |
|                                                                       | Methoxychlor (mg/kg)                    |                |                |                 |                 |                 |
|                                                                       | Mirex (mg/kg)                           |                |                |                 |                 |                 |
|                                                                       | cis-Nonachlor (mg/kg)                   |                |                |                 |                 |                 |
|                                                                       | trans-Nonachlor (mg/kg)                 |                |                |                 |                 |                 |
|                                                                       | Oxychlordane (mg/kg)                    |                |                |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                         | L685670-18    | L685670-20    | L685670-43    | L685670-59     | L685670-74    |
|-----------------------------------------------------------------------|-----------------------------------------|---------------|---------------|---------------|----------------|---------------|
|                                                                       |                                         | 26-AUG-08     | 29-AUG-08     | 29-AUG-08     | 25-AUG-08      | 26-AUG-08     |
|                                                                       |                                         | YUKA#1 SOIL M | YUKA#1 SOIL M | YUCA#1 SOIL O | ARROZ#1 SOIL O | YUCA#1 SOIL O |
| Grouping                                                              | Analyte                                 |               |               |               |                |               |
| <b>SOIL</b>                                                           |                                         |               |               |               |                |               |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Surrogate: d12-Chrysene (SS) (%)        |               |               | 95            | 96             | 97            |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)      |               |               | 92            | 95             | 92            |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)    |               |               | 95            | 96             | 99            |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1221 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1232 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1242 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1248 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1254 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1260 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1262 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | PCB-1268 (mg/kg)                        |               |               | <0.010        | <0.015         | <0.020        |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg) |               |               | <0.010        | <0.015         | <0.020        |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                          |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | alpha-BHC (mg/kg)                       |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | beta-BHC (mg/kg)                        |               |               | <0.0020       | <0.0020        | <0.0020       |
|                                                                       | Lindane (gamma - BHC) (mg/kg)           |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | delta-BHC (mg/kg)                       |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | cis-Chlordane (alpha) (mg/kg)           |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | trans-Chlordane (gamma) (mg/kg)         |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | 2,4'-DDD (mg/kg)                        |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | 4,4'-DDD (mg/kg)                        |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | 2,4'-DDE (mg/kg)                        |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | 4,4'-DDE (mg/kg)                        |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | 2,4'-DDT (mg/kg)                        |               |               | <0.0020       | <0.0020        | <0.0020       |
|                                                                       | 4,4'-DDT (mg/kg)                        |               |               | <0.0020       | <0.0020        | <0.0020       |
|                                                                       | Dieldrin (mg/kg)                        |               |               | <0.0050       | <0.0070        | <0.0090       |
|                                                                       | Endosulfan I (mg/kg)                    |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | Endosulfan II (mg/kg)                   |               |               | <0.0050       | <0.0070        | <0.0090       |
|                                                                       | Endosulfan Sulfate (mg/kg)              |               |               | <0.0050       | <0.0070        | <0.0090       |
|                                                                       | Endrin (mg/kg)                          |               |               | <0.0050       | <0.0070        | <0.010        |
|                                                                       | Heptachlor (mg/kg)                      |               |               | <0.0020       | <0.0020        | <0.0020       |
|                                                                       | Heptachlor Epoxide (mg/kg)              |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | Methoxychlor (mg/kg)                    |               |               | <0.0050       | <0.0070        | <0.0090       |
|                                                                       | Mirex (mg/kg)                           |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | cis-Nonachlor (mg/kg)                   |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | trans-Nonachlor (mg/kg)                 |               |               | <0.0010       | <0.0014        | <0.0020       |
|                                                                       | Oxychlordane (mg/kg)                    |               |               | <0.0010       | <0.0014        | <0.0020       |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                         | <b>Sample ID</b><br><b>Description</b><br><b>Sampled Date</b><br><b>Sampled Time</b><br><b>Client ID</b> | L685670-77    |  |  |  |  |
|-----------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------|---------------|--|--|--|--|
|                                         |                                         |                                                                                                          | 27-AUG-08     |  |  |  |  |
|                                         |                                         |                                                                                                          | RICE#1 SOIL O |  |  |  |  |
| Grouping                                | Analyte                                 |                                                                                                          |               |  |  |  |  |
| <b>SOIL</b>                             |                                         |                                                                                                          |               |  |  |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Surrogate: d12-Chrysene (SS) (%)        | 95                                                                                                       |               |  |  |  |  |
|                                         | Surrogate: d8-Naphthalene (SS) (%)      | 93                                                                                                       |               |  |  |  |  |
|                                         | Surrogate: d10-Phenanthrene (SS) (%)    | 96                                                                                                       |               |  |  |  |  |
| <b>Polychlorinated Biphenyls</b>        | PCB-1016 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1221 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1232 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1242 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1248 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1254 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1260 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1262 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | PCB-1268 (mg/kg)                        | <0.015                                                                                                   |               |  |  |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg) | <0.015                                                                                                   |               |  |  |  |  |
| <b>Organochlorine Pesticides</b>        | Aldrin (mg/kg)                          | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | alpha-BHC (mg/kg)                       | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | beta-BHC (mg/kg)                        | <0.0020                                                                                                  |               |  |  |  |  |
|                                         | Lindane (gamma - BHC) (mg/kg)           | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | delta-BHC (mg/kg)                       | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | cis-Chlordane (alpha) (mg/kg)           | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | trans-Chlordane (gamma) (mg/kg)         | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | 2,4'-DDD (mg/kg)                        | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | 4,4'-DDD (mg/kg)                        | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | 2,4'-DDE (mg/kg)                        | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | 4,4'-DDE (mg/kg)                        | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | 2,4'-DDT (mg/kg)                        | <0.0020                                                                                                  |               |  |  |  |  |
|                                         | 4,4'-DDT (mg/kg)                        | <0.0020                                                                                                  |               |  |  |  |  |
|                                         | Dieldrin (mg/kg)                        | <0.0080                                                                                                  |               |  |  |  |  |
|                                         | Endosulfan I (mg/kg)                    | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | Endosulfan II (mg/kg)                   | <0.0080                                                                                                  |               |  |  |  |  |
|                                         | Endosulfan Sulfate (mg/kg)              | <0.0080                                                                                                  |               |  |  |  |  |
|                                         | Endrin (mg/kg)                          | <0.0080                                                                                                  |               |  |  |  |  |
|                                         | Heptachlor (mg/kg)                      | <0.0020                                                                                                  |               |  |  |  |  |
|                                         | Heptachlor Epoxide (mg/kg)              | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | Methoxychlor (mg/kg)                    | <0.0080                                                                                                  |               |  |  |  |  |
|                                         | Mirex (mg/kg)                           | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | cis-Nonachlor (mg/kg)                   | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | trans-Nonachlor (mg/kg)                 | <0.0015                                                                                                  |               |  |  |  |  |
|                                         | Oxychlordane (mg/kg)                    | <0.0015                                                                                                  |               |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |         | L685670-9      | L685670-10     | L685670-13      | L685670-14      | L685670-15      |
|-----------------------------------------------------------------------|---------|----------------|----------------|-----------------|-----------------|-----------------|
| Grouping                                                              | Analyte | ARROZ#1 SOIL M | ARROZ#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M | GUINEO#1 SOIL M |
| SOIL                                                                  |         |                |                |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |         | L685670-18 | L685670-20 | L685670-43 | L685670-59 | L685670-74 |
|-----------------------------------------------------------------------|---------|------------|------------|------------|------------|------------|
| Grouping                                                              | Analyte |            |            |            |            |            |
| SOIL                                                                  |         |            |            |            |            |            |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                                                                          |  |                |  |  |  |  |
|----------------------------------------------------------------------------------------------------------|--|----------------|--|--|--|--|
| <b>Sample ID</b><br><b>Description</b><br><b>Sampled Date</b><br><b>Sampled Time</b><br><b>Client ID</b> |  | L685670-77     |  |  |  |  |
| <b>Grouping</b>                                                                                          |  | <b>Analyte</b> |  |  |  |  |
| SOIL                                                                                                     |  |                |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-1           | L685670-2           | L685670-3           | L685670-7      | L685670-8      |
|-----------------------------------------------------------------------|-----------------------------------|---------------------|---------------------|---------------------|----------------|----------------|
|                                                                       |                                   | 27-AUG-08           | 28-AUG-08           | 29-AUG-08           | 26-AUG-08      | 29-AUG-08      |
|                                                                       |                                   | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | YUCA#1 FRUTO M | YUCA#1 FRUTO M |
| Grouping                                                              | Analyte                           |                     |                     |                     |                |                |
| TISSUE                                                                |                                   |                     |                     |                     |                |                |
| Physical Tests                                                        | % Moisture (%)                    | 87.4                | 80.1                | 72.3                | 66.6           | 65.8           |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 23                  | 11                  | 19                  | 55             | 58             |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 2.9                 | 2.2                 | 5.3                 | 18.4           | 19.9           |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10               | <0.050              | <0.050              | <0.050         | <0.050         |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010              | <0.010              | <0.010              | <0.010         | <0.010         |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.10               | <0.050              | <0.050              | <0.050         | <0.050         |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010              | <0.010              | <0.010              | <0.010         | <0.010         |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 20.2                | 42.1                | 0.971               | 2.67           | 2.92           |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 2.54                | 8.36                | 0.269               | 0.891          | 1.00           |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60               | <0.30               | <0.30               | <0.30          | <0.30          |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60               | <0.30               | <0.30               | <0.30          | <0.30          |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030              | <0.030              | <0.030              | <0.030         | <0.030         |
|                                                                       | Boron (B)-Total (mg/kg)           | 48                  | 36                  | 18                  | 15             | 14             |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 6.0                 | 7.1                 | 5.0                 | 4.8            | 4.8            |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | <0.060              | <0.030              | <0.030              | <0.030         | <0.030         |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | <0.0050             | <0.0050             | <0.0050             | <0.0050        | <0.0050        |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 3280                | 1240                | 389                 | 662            | 917            |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 413                 | 246                 | 108                 | 221            | 313            |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | <1.0                | <0.50               | <0.50               | <0.50          | <0.50          |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | <0.10               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.20               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020              | <0.020              | <0.020              | <0.020         | <0.020         |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 3.22                | 2.36                | 4.85                | 2.84           | 2.89           |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.404               | 0.469               | 1.34                | 0.949          | 0.988          |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.20               | <0.10               | 0.13                | 1.41           | 1.25           |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020              | <0.020              | 0.037               | 0.470          | 0.427          |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0                | <0.50               | <0.50               | <0.50          | <0.50          |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 3430                | 1580                | 752                 | 964            | 1380           |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 431                 | 314                 | 208                 | 321            | 471            |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 101                 | 199                 | 8.29                | 9.57           | 11.8           |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 12.7                | 39.6                | 2.29                | 3.19           | 4.02           |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0057              | <0.0050             | <0.0050             | <0.0050        | <0.0050        |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | <0.0010             | <0.0010             | <0.0010             | <0.0010        | 0.0011         |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.12                | <0.050              | 0.276               | 0.185          | 0.172          |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.015               | <0.010              | 0.076               | 0.062          | 0.059          |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <1.0                | <0.50               | <0.50               | <0.50          | <0.50          |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | <0.10               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.38                | <0.10               | <0.10               | <0.10          | 0.11           |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-24         | L685670-25         | L685670-26          | L685670-27          | L685670-31           |
|-----------------------------------------------------------------------|-----------------------------------|--------------------|--------------------|---------------------|---------------------|----------------------|
|                                                                       |                                   | 27-AUG-08          | 25-AUG-08          | 27-AUG-08           | 25-AUG-08           | 29-AUG-08            |
|                                                                       |                                   | ARROZ#1 GRANO<br>M | ARROZ#1 GRANO<br>M | ARROZ#1 LEAVES<br>M | ARROZ#1 LEAVES<br>M | GUINEO#1<br>LEAVES M |
| Grouping                                                              | Analyte                           |                    |                    |                     |                     |                      |
| TISSUE                                                                |                                   |                    |                    |                     |                     |                      |
| Physical Tests                                                        | % Moisture (%)                    | 50.1               | 37.5               | 52.9                | 36.1                | 77.8                 |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 28                 | 17                 | 57                  | <10                 | 200                  |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 13.8               | 10.6               | 26.8                | <6.0                | 44.4                 |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050             | <0.050             | <0.050              | <0.050              | <0.050               |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.030             | <0.030             | <0.030              | <0.030              | <0.030               |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050             | <0.050             | <0.050              | <0.050              | <0.050               |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.030             | <0.030             | <0.030              | <0.030              | <0.030               |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 11.3               | 18.9               | 144                 | 91.0                | 46.7                 |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 5.65               | 11.8               | 67.9                | 58.2                | 10.4                 |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30              | <0.30              | <0.30               | <0.30               | <0.30                |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.30              | <0.30              | <0.30               | <0.30               | <0.30                |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30              | <0.30              | <0.30               | <0.30               | <0.30                |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.090             | <0.090             | <0.090              | <0.090              | <0.090               |
|                                                                       | Boron (B)-Total (mg/kg)           | 24                 | 20                 | 29                  | 13                  | 124                  |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 12.2               | 12.2               | 13.7                | 8.4                 | 27.6                 |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.054              | 0.104              | 0.049               | 0.097               | <0.030               |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.027              | 0.065              | 0.023               | 0.062               | <0.015               |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 467                | 541                | 7340                | 3080                | 29500                |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 233                | 338                | 3460                | 1970                | 6560                 |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 8.49               | 3.84               | 6.38                | 7.35                | 5.79                 |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 4.23               | 2.40               | 3.00                | 4.70                | 1.29                 |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.14               | <0.10              | 0.19                | 0.13                | 0.10                 |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.072              | <0.060             | 0.091               | 0.084               | <0.060               |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 6.17               | 4.79               | 10.4                | 9.18                | 31.8                 |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 3.08               | 2.99               | 4.88                | 5.87                | 7.07                 |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10              | <0.10              | <0.10               | 0.34                | 0.60                 |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.060             | <0.060             | <0.060              | 0.216               | 0.134                |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50              | <0.50              | <0.50               | <0.50               | <0.50                |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.30              | <0.30              | <0.30               | <0.30               | <0.30                |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1070               | 774                | 2740                | 2510                | 9410                 |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 534                | 484                | 1290                | 1600                | 2090                 |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 301                | 480                | 3380                | 1080                | 976                  |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 150                | 300                | 1590                | 690                 | 217                  |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0078             | 0.0080             | 0.0197              | 0.0162              | 0.0278               |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0039             | 0.0040             | 0.0123              | 0.0077              | 0.0178               |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.205              | 0.128              | 0.437               | 0.287               | 2.94                 |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.102              | 0.080              | 0.206               | 0.183               | 0.654                |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 4.32               | 3.00               | 2.65                | 3.36                | 3.49                 |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 2.16               | 1.88               | 1.25                | 2.15                | 0.78                 |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.19               | 0.18               | 0.34                | 0.52                | 0.17                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-32           | L685670-33           | L685670-37         | L685670-38         | L685670-41         |
|-----------------------------------------------------------------------|-----------------------------------|----------------------|----------------------|--------------------|--------------------|--------------------|
|                                                                       |                                   | 27-AUG-08            | 28-AUG-08            | 29-AUG-08          | 26-AUG-08          | 29-AUG-08          |
|                                                                       |                                   | GUINEO#1<br>LEAVES M | GUINEO#1<br>LEAVES M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>O |
| Grouping                                                              | Analyte                           |                      |                      |                    |                    |                    |
| TISSUE                                                                |                                   |                      |                      |                    |                    |                    |
| Physical Tests                                                        | % Moisture (%)                    | 80.8                 | 72.1                 | 69.7               | 70.4               | 69.4               |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 26                   | 67                   | 81                 | 199                |                    |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 5.0                  | 18.6                 | 24.7               | 59.0               |                    |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050               | <0.050               | <0.050             | <0.050             |                    |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010               | <0.010               | <0.020             | <0.020             |                    |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050               | <0.050               | <0.050             | <0.050             |                    |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010               | <0.010               | <0.020             | <0.020             |                    |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 92.5                 | 110                  | 6.41               | 25.5               |                    |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 17.7                 | 30.8                 | 1.94               | 7.56               |                    |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                | <0.30                | <0.30              | <0.30              |                    |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                | <0.10                | <0.20              | <0.20              |                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                | <0.30                | <0.30              | <0.30              |                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030               | <0.030               | <0.060             | <0.060             |                    |
|                                                                       | Boron (B)-Total (mg/kg)           | 40                   | 22                   | 51                 | 53                 |                    |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 7.8                  | 6.1                  | 15.4               | 15.7               |                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | <0.030               | <0.030               | <0.030             | 0.032              |                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | <0.0050              | <0.0050              | <0.010             | <0.010             |                    |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 6720                 | 6150                 | 9170               | 10900              |                    |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 1290                 | 1720                 | 2780               | 3220               |                    |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 1.07                 | 0.95                 | <0.50              | <0.50              |                    |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.20                 | 0.27                 | <0.20              | <0.20              |                    |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10                | <0.10                | <0.10              | 0.51               |                    |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020               | <0.020               | <0.040             | 0.150              |                    |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 6.97                 | 3.20                 | 8.24               | 8.25               |                    |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 1.34                 | 0.893                | 2.50               | 2.44               |                    |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10                | <0.10                | 1.39               | 0.27               |                    |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020               | 0.021                | 0.421              | 0.081              |                    |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                | <0.50                | <0.50              | <0.50              |                    |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                | <0.10                | <0.20              | <0.20              |                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 4070                 | 2240                 | 3740               | 3230               |                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 779                  | 625                  | 1140               | 958                |                    |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 655                  | 1430                 | 255                | 742                |                    |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 125                  | 400                  | 77.5               | 220                |                    |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0214               | 0.0191               | 0.0251             | 0.0411             |                    |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0048               | 0.0053               | 0.0076             | 0.0122             |                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.201                | 0.067                | 1.29               | <0.050             |                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.038                | 0.019                | 0.393              | <0.020             |                    |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 0.66                 | 0.78                 | 0.88               | 0.91               |                    |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.13                 | 0.22                 | 0.27               | 0.27               |                    |
|                                                                       | Selenium (Se)-Total (mg/kg)       | <0.10                | 0.18                 | <0.10              | 0.15               |                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-42     | L685670-55          | L685670-56          | L685670-57         | L685670-58         |
|-----------------------------------------------------------------------|-----------------------------------|----------------|---------------------|---------------------|--------------------|--------------------|
|                                                                       |                                   | 29-AUG-08      | 27-AUG-08           | 25-AUG-08           | 27-AUG-08          | 25-AUG-08          |
|                                                                       |                                   | YUCA#1 FRUTO O | ARROZ#1 LEAVES<br>O | ARROZ#1 LEAVES<br>O | ARROZ#1 GRANO<br>O | ARROZ#1 GRANO<br>O |
| Grouping                                                              | Analyte                           |                |                     |                     |                    |                    |
| TISSUE                                                                |                                   |                |                     |                     |                    |                    |
| Physical Tests                                                        | % Moisture (%)                    | 69.5           | 61.8                | 50.6                | 58.3               | 34.6               |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       |                |                     |                     |                    |                    |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   |                |                     |                     |                    |                    |
|                                                                       | Antimony (Sb)-Total (mg/kg)       |                |                     |                     |                    |                    |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   |                |                     |                     |                    |                    |
|                                                                       | Arsenic (As)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Barium (Ba)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Beryllium (Be)-Total (mg/kg)      |                |                     |                     |                    |                    |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  |                |                     |                     |                    |                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Boron (B)-Total (mg/kg)           |                |                     |                     |                    |                    |
|                                                                       | Boron (B)-Total (mg/kg wwt)       |                |                     |                     |                    |                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Calcium (Ca)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Chromium (Cr)-Total (mg/kg)       |                |                     |                     |                    |                    |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   |                |                     |                     |                    |                    |
|                                                                       | Cobalt (Co)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Copper (Cu)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Lead (Pb)-Total (mg/kg)           |                |                     |                     |                    |                    |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       |                |                     |                     |                    |                    |
|                                                                       | Lithium (Li)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      |                |                     |                     |                    |                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  |                |                     |                     |                    |                    |
|                                                                       | Manganese (Mn)-Total (mg/kg)      |                |                     |                     |                    |                    |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  |                |                     |                     |                    |                    |
|                                                                       | Mercury (Hg)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     |                |                     |                     |                    |                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) |                |                     |                     |                    |                    |
|                                                                       | Nickel (Ni)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Selenium (Se)-Total (mg/kg)       |                |                     |                     |                    |                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                |                                   | Sample ID              |                |  |  |
|----------------|-----------------------------------|------------------------|----------------|--|--|
|                |                                   | Description            |                |  |  |
|                |                                   | Sampled Date           |                |  |  |
|                |                                   | Sampled Time           |                |  |  |
|                |                                   | Client ID              |                |  |  |
|                |                                   | L685670-72             | L685670-73     |  |  |
|                |                                   | 26-AUG-08              | 26-AUG-08      |  |  |
|                |                                   | YUCA#1 RAIZ<br>ROOTS O | YUCA#1 HOJAS O |  |  |
| Grouping       | Analyte                           |                        |                |  |  |
| TISSUE         |                                   |                        |                |  |  |
| Physical Tests | % Moisture (%)                    | 63.5                   | 75.6           |  |  |
| Metals         | Aluminum (Al)-Total (mg/kg)       |                        |                |  |  |
|                | Aluminum (Al)-Total (mg/kg wwt)   |                        |                |  |  |
|                | Antimony (Sb)-Total (mg/kg)       |                        |                |  |  |
|                | Antimony (Sb)-Total (mg/kg wwt)   |                        |                |  |  |
|                | Arsenic (As)-Total (mg/kg)        |                        |                |  |  |
|                | Arsenic (As)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Barium (Ba)-Total (mg/kg)         |                        |                |  |  |
|                | Barium (Ba)-Total (mg/kg wwt)     |                        |                |  |  |
|                | Beryllium (Be)-Total (mg/kg)      |                        |                |  |  |
|                | Beryllium (Be)-Total (mg/kg wwt)  |                        |                |  |  |
|                | Bismuth (Bi)-Total (mg/kg)        |                        |                |  |  |
|                | Bismuth (Bi)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Boron (B)-Total (mg/kg)           |                        |                |  |  |
|                | Boron (B)-Total (mg/kg wwt)       |                        |                |  |  |
|                | Cadmium (Cd)-Total (mg/kg)        |                        |                |  |  |
|                | Cadmium (Cd)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Calcium (Ca)-Total (mg/kg)        |                        |                |  |  |
|                | Calcium (Ca)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Chromium (Cr)-Total (mg/kg)       |                        |                |  |  |
|                | Chromium (Cr)-Total (mg/kg wwt)   |                        |                |  |  |
|                | Cobalt (Co)-Total (mg/kg)         |                        |                |  |  |
|                | Cobalt (Co)-Total (mg/kg wwt)     |                        |                |  |  |
|                | Copper (Cu)-Total (mg/kg)         |                        |                |  |  |
|                | Copper (Cu)-Total (mg/kg wwt)     |                        |                |  |  |
|                | Lead (Pb)-Total (mg/kg)           |                        |                |  |  |
|                | Lead (Pb)-Total (mg/kg wwt)       |                        |                |  |  |
|                | Lithium (Li)-Total (mg/kg)        |                        |                |  |  |
|                | Lithium (Li)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Magnesium (Mg)-Total (mg/kg)      |                        |                |  |  |
|                | Magnesium (Mg)-Total (mg/kg wwt)  |                        |                |  |  |
|                | Manganese (Mn)-Total (mg/kg)      |                        |                |  |  |
|                | Manganese (Mn)-Total (mg/kg wwt)  |                        |                |  |  |
|                | Mercury (Hg)-Total (mg/kg)        |                        |                |  |  |
|                | Mercury (Hg)-Total (mg/kg wwt)    |                        |                |  |  |
|                | Molybdenum (Mo)-Total (mg/kg)     |                        |                |  |  |
|                | Molybdenum (Mo)-Total (mg/kg wwt) |                        |                |  |  |
|                | Nickel (Ni)-Total (mg/kg)         |                        |                |  |  |
|                | Nickel (Ni)-Total (mg/kg wwt)     |                        |                |  |  |
|                | Selenium (Se)-Total (mg/kg)       |                        |                |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-1           | L685670-2           | L685670-3           | L685670-7      | L685670-8      |
|-----------------------------------------------------------------------|-----------------------------------|---------------------|---------------------|---------------------|----------------|----------------|
|                                                                       |                                   | 27-AUG-08           | 28-AUG-08           | 29-AUG-08           | 26-AUG-08      | 29-AUG-08      |
|                                                                       |                                   | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | YUCA#1 FRUTO M | YUCA#1 FRUTO M |
| Grouping                                                              | Analyte                           |                     |                     |                     |                |                |
| <b>TISSUE</b>                                                         |                                   |                     |                     |                     |                |                |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.048               | <0.020              | <0.020              | <0.020         | 0.037          |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030              | <0.030              | <0.030              | <0.030         | <0.030         |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010              | <0.010              | <0.010              | <0.010         | <0.010         |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 25.6                | 16.5                | 3.53                | 6.30           | 7.75           |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 3.22                | 3.28                | 0.976               | 2.10           | 2.65           |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.060              | <0.030              | <0.030              | <0.030         | <0.030         |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010              | <0.010              | <0.010              | <0.010         | <0.010         |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.40               | <0.20               | <0.20               | <0.20          | <0.20          |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050              | <0.050              | <0.050              | <0.050         | <0.050         |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.020              | <0.010              | <0.010              | <0.010         | <0.010         |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020             | <0.0020             | <0.0020             | <0.0020        | <0.0020        |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <1.0                | <0.50               | <0.50               | <0.50          | <0.50          |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10               | <0.10               | <0.10               | <0.10          | <0.10          |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 34.3                | 15.4                | 10.9                | 17.5           | 28.8           |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 4.31                | 3.06                | 3.01                | 5.83           | 9.84           |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                     |                     |                     |                |                |
|                                                                       | Acenaphthene (mg/kg wwt)          |                     |                     |                     |                |                |
|                                                                       | Acenaphthylene (mg/kg)            |                     |                     |                     |                |                |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                     |                     |                     |                |                |
|                                                                       | Anthracene (mg/kg)                |                     |                     |                     |                |                |
|                                                                       | Anthracene (mg/kg wwt)            |                     |                     |                     |                |                |
|                                                                       | Benz(a)anthracene (mg/kg)         |                     |                     |                     |                |                |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                     |                     |                     |                |                |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                     |                     |                     |                |                |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                     |                     |                     |                |                |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                     |                     |                     |                |                |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                     |                     |                     |                |                |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                     |                     |                     |                |                |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                     |                     |                     |                |                |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                     |                     |                     |                |                |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                     |                     |                     |                |                |
|                                                                       | Chrysene (mg/kg)                  |                     |                     |                     |                |                |
|                                                                       | Chrysene (mg/kg wwt)              |                     |                     |                     |                |                |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                     |                     |                     |                |                |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                     |                     |                     |                |                |
|                                                                       | Fluoranthene (mg/kg)              |                     |                     |                     |                |                |
|                                                                       | Fluoranthene (mg/kg wwt)          |                     |                     |                     |                |                |
|                                                                       | Fluorene (mg/kg)                  |                     |                     |                     |                |                |
|                                                                       | Fluorene (mg/kg wwt)              |                     |                     |                     |                |                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-24         | L685670-25         | L685670-26          | L685670-27          | L685670-31           |
|-----------------------------------------------------------------------|-----------------------------------|--------------------|--------------------|---------------------|---------------------|----------------------|
|                                                                       |                                   | 27-AUG-08          | 25-AUG-08          | 27-AUG-08           | 25-AUG-08           | 29-AUG-08            |
|                                                                       |                                   | ARROZ#1 GRANO<br>M | ARROZ#1 GRANO<br>M | ARROZ#1 LEAVES<br>M | ARROZ#1 LEAVES<br>M | GUINEO#1<br>LEAVES M |
| Grouping                                                              | Analyte                           |                    |                    |                     |                     |                      |
| <b>TISSUE</b>                                                         |                                   |                    |                    |                     |                     |                      |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.096              | 0.088              | 0.212               | 0.243               | 0.109                |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030             | <0.030             | <0.030              | <0.030              | <0.030               |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010             | <0.010             | <0.010              | <0.010              | <0.010               |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 3.01               | 4.30               | 41.1                | 19.9                | 186                  |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 1.50               | 2.69               | 19.3                | 12.7                | 41.4                 |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030             | <0.030             | <0.030              | <0.030              | 0.040                |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.030             | <0.030             | <0.030              | <0.030              | <0.030               |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20              | <0.20              | <0.20               | <0.20               | <0.20                |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.15              | <0.15              | <0.15               | <0.15               | <0.15                |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010             | <0.010             | <0.010              | <0.010              | <0.010               |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0060            | <0.0060            | <0.0060             | <0.0060             | <0.0060              |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50              | <0.50              | <0.50               | <0.50               | <0.50                |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.30              | <0.30              | <0.30               | <0.30               | <0.30                |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 46.0               | 54.6               | 26.4                | 29.6                | 61.3                 |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 22.9               | 34.2               | 12.4                | 18.9                | 13.6                 |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                    |                    |                     |                     |                      |
|                                                                       | Acenaphthene (mg/kg wwt)          |                    |                    |                     |                     |                      |
|                                                                       | Acenaphthylene (mg/kg)            |                    |                    |                     |                     |                      |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                    |                    |                     |                     |                      |
|                                                                       | Anthracene (mg/kg)                |                    |                    |                     |                     |                      |
|                                                                       | Anthracene (mg/kg wwt)            |                    |                    |                     |                     |                      |
|                                                                       | Benz(a)anthracene (mg/kg)         |                    |                    |                     |                     |                      |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                    |                    |                     |                     |                      |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                    |                    |                     |                     |                      |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                    |                    |                     |                     |                      |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                    |                    |                     |                     |                      |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                    |                    |                     |                     |                      |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                    |                    |                     |                     |                      |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                    |                    |                     |                     |                      |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                    |                    |                     |                     |                      |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                    |                    |                     |                     |                      |
|                                                                       | Chrysene (mg/kg)                  |                    |                    |                     |                     |                      |
|                                                                       | Chrysene (mg/kg wwt)              |                    |                    |                     |                     |                      |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                    |                    |                     |                     |                      |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                    |                    |                     |                     |                      |
|                                                                       | Fluoranthene (mg/kg)              |                    |                    |                     |                     |                      |
|                                                                       | Fluoranthene (mg/kg wwt)          |                    |                    |                     |                     |                      |
|                                                                       | Fluorene (mg/kg)                  |                    |                    |                     |                     |                      |
|                                                                       | Fluorene (mg/kg wwt)              |                    |                    |                     |                     |                      |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                   | Sample ID    | L685670-32           | L685670-33           | L685670-37         | L685670-38         | L685670-41         |
|-------------------------------------------------|-----------------------------------|--------------|----------------------|----------------------|--------------------|--------------------|--------------------|
|                                                 |                                   | Description  |                      |                      |                    |                    |                    |
|                                                 |                                   | Sampled Date | 27-AUG-08            | 28-AUG-08            | 29-AUG-08          | 26-AUG-08          | 29-AUG-08          |
|                                                 |                                   | Sampled Time |                      |                      |                    |                    |                    |
|                                                 |                                   | Client ID    | GUINEO#1<br>LEAVES M | GUINEO#1<br>LEAVES M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>O |
| Grouping                                        | Analyte                           |              |                      |                      |                    |                    |                    |
| <b>TISSUE</b>                                   |                                   |              |                      |                      |                    |                    |                    |
| <b>Metals</b>                                   | Selenium (Se)-Total (mg/kg wwt)   |              | <0.020               | 0.051                | 0.021              | 0.044              |                    |
|                                                 | Silver (Ag)-Total (mg/kg)         |              | <0.030               | <0.030               | <0.030             | <0.030             |                    |
|                                                 | Silver (Ag)-Total (mg/kg wwt)     |              | <0.010               | <0.010               | <0.010             | <0.010             |                    |
|                                                 | Strontium (Sr)-Total (mg/kg)      |              | 60.5                 | 54.2                 | 38.1               | 64.3               |                    |
|                                                 | Strontium (Sr)-Total (mg/kg wwt)  |              | 11.6                 | 15.2                 | 11.6               | 19.1               |                    |
|                                                 | Thallium (Tl)-Total (mg/kg)       |              | <0.030               | <0.030               | <0.030             | <0.030             |                    |
|                                                 | Thallium (Tl)-Total (mg/kg wwt)   |              | <0.010               | <0.010               | <0.020             | <0.020             |                    |
|                                                 | Tin (Sn)-Total (mg/kg)            |              | <0.20                | <0.20                | <0.20              | <0.20              |                    |
|                                                 | Tin (Sn)-Total (mg/kg wwt)        |              | <0.050               | <0.050               | <0.10              | <0.10              |                    |
|                                                 | Uranium (U)-Total (mg/kg)         |              | <0.010               | <0.010               | <0.010             | <0.010             |                    |
|                                                 | Uranium (U)-Total (mg/kg wwt)     |              | <0.0020              | <0.0020              | <0.0040            | <0.0040            |                    |
|                                                 | Vanadium (V)-Total (mg/kg)        |              | <0.50                | <0.50                | <0.50              | <0.50              |                    |
|                                                 | Vanadium (V)-Total (mg/kg wwt)    |              | <0.10                | <0.10                | <0.20              | <0.20              |                    |
|                                                 | Zinc (Zn)-Total (mg/kg)           |              | 18.4                 | 10.5                 | 166                | 119                |                    |
|                                                 | Zinc (Zn)-Total (mg/kg wwt)       |              | 3.53                 | 2.94                 | 50.4               | 35.2               |                    |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Acenaphthene (mg/kg)              |              |                      |                      |                    |                    | <0.075             |
|                                                 | Acenaphthene (mg/kg wwt)          |              |                      |                      |                    |                    | <0.020             |
|                                                 | Acenaphthylene (mg/kg)            |              |                      |                      |                    |                    | <0.075             |
|                                                 | Acenaphthylene (mg/kg wwt)        |              |                      |                      |                    |                    | <0.020             |
|                                                 | Anthracene (mg/kg)                |              |                      |                      |                    |                    | <0.075             |
|                                                 | Anthracene (mg/kg wwt)            |              |                      |                      |                    |                    | <0.020             |
|                                                 | Benz(a)anthracene (mg/kg)         |              |                      |                      |                    |                    | <0.075             |
|                                                 | Benz(a)anthracene (mg/kg wwt)     |              |                      |                      |                    |                    | <0.020             |
|                                                 | Benzo(a)pyrene (mg/kg)            |              |                      |                      |                    |                    | <0.075             |
|                                                 | Benzo(a)pyrene (mg/kg wwt)        |              |                      |                      |                    |                    | <0.020             |
|                                                 | Benzo(b)fluoranthene (mg/kg)      |              |                      |                      |                    |                    | <0.075             |
|                                                 | Benzo(b)fluoranthene (mg/kg wwt)  |              |                      |                      |                    |                    | <0.020             |
|                                                 | Benzo(g,h,i)perylene (mg/kg)      |              |                      |                      |                    |                    | <0.30              |
|                                                 | Benzo(g,h,i)perylene (mg/kg wwt)  |              |                      |                      |                    |                    | <0.080             |
|                                                 | Benzo(k)fluoranthene (mg/kg)      |              |                      |                      |                    |                    | <0.075             |
|                                                 | Benzo(k)fluoranthene (mg/kg wwt)  |              |                      |                      |                    |                    | <0.020             |
|                                                 | Chrysene (mg/kg)                  |              |                      |                      |                    |                    | <0.075             |
|                                                 | Chrysene (mg/kg wwt)              |              |                      |                      |                    |                    | <0.020             |
|                                                 | Dibenz(a,h)anthracene (mg/kg)     |              |                      |                      |                    |                    | <0.075             |
|                                                 | Dibenz(a,h)anthracene (mg/kg wwt) |              |                      |                      |                    |                    | <0.020             |
|                                                 | Fluoranthene (mg/kg)              |              |                      |                      |                    |                    | <0.075             |
|                                                 | Fluoranthene (mg/kg wwt)          |              |                      |                      |                    |                    | <0.020             |
|                                                 | Fluorene (mg/kg)                  |              |                      |                      |                    |                    | <0.30              |
|                                                 | Fluorene (mg/kg wwt)              |              |                      |                      |                    |                    | <0.080             |

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| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L685670-42     | L685670-55          | L685670-56          | L685670-57         | L685670-58         |
|-----------------------------------------------------------------------|-----------------------------------|----------------|---------------------|---------------------|--------------------|--------------------|
|                                                                       |                                   | 29-AUG-08      | 27-AUG-08           | 25-AUG-08           | 27-AUG-08          | 25-AUG-08          |
|                                                                       |                                   | YUCA#1 FRUTO O | ARROZ#1 LEAVES<br>O | ARROZ#1 LEAVES<br>O | ARROZ#1 GRANO<br>O | ARROZ#1 GRANO<br>O |
| Grouping                                                              | Analyte                           |                |                     |                     |                    |                    |
| <b>TISSUE</b>                                                         |                                   |                |                     |                     |                    |                    |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   |                |                     |                     |                    |                    |
|                                                                       | Silver (Ag)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Strontium (Sr)-Total (mg/kg)      |                |                     |                     |                    |                    |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  |                |                     |                     |                    |                    |
|                                                                       | Thallium (Tl)-Total (mg/kg)       |                |                     |                     |                    |                    |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   |                |                     |                     |                    |                    |
|                                                                       | Tin (Sn)-Total (mg/kg)            |                |                     |                     |                    |                    |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        |                |                     |                     |                    |                    |
|                                                                       | Uranium (U)-Total (mg/kg)         |                |                     |                     |                    |                    |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     |                |                     |                     |                    |                    |
|                                                                       | Vanadium (V)-Total (mg/kg)        |                |                     |                     |                    |                    |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    |                |                     |                     |                    |                    |
|                                                                       | Zinc (Zn)-Total (mg/kg)           |                |                     |                     |                    |                    |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       |                |                     |                     |                    |                    |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Acenaphthene (mg/kg wwt)          | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Acenaphthylene (mg/kg)            | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Acenaphthylene (mg/kg wwt)        | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Anthracene (mg/kg)                | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Anthracene (mg/kg wwt)            | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Benz(a)anthracene (mg/kg)         | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Benzo(a)pyrene (mg/kg)            | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      | <0.075         | <0.060              | <0.050              | <0.050             | <0.050             |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  | <0.010         | <0.030              | <0.020              | <0.020             | <0.030             |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  | <0.020         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Chrysene (mg/kg)                  | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Chrysene (mg/kg wwt)              | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Fluoranthene (mg/kg)              | <0.075         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Fluoranthene (mg/kg wwt)          | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Fluorene (mg/kg)                  | <0.075         | <0.20               | <0.20               | <0.050             | <0.050             |
|                                                                       | Fluorene (mg/kg wwt)              | <0.010         | <0.060              | <0.060              | <0.020             | <0.030             |



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|                                        |                                   | Sample ID    |        |  |  |  |
|----------------------------------------|-----------------------------------|--------------|--------|--|--|--|
|                                        |                                   | Description  |        |  |  |  |
|                                        |                                   | Sampled Date |        |  |  |  |
|                                        |                                   | Sampled Time |        |  |  |  |
|                                        |                                   | Client ID    |        |  |  |  |
| Grouping                               | Analyte                           |              |        |  |  |  |
| TISSUE                                 |                                   |              |        |  |  |  |
| Metals                                 | Selenium (Se)-Total (mg/kg wwt)   |              |        |  |  |  |
|                                        | Silver (Ag)-Total (mg/kg)         |              |        |  |  |  |
|                                        | Silver (Ag)-Total (mg/kg wwt)     |              |        |  |  |  |
|                                        | Strontium (Sr)-Total (mg/kg)      |              |        |  |  |  |
|                                        | Strontium (Sr)-Total (mg/kg wwt)  |              |        |  |  |  |
|                                        | Thallium (Tl)-Total (mg/kg)       |              |        |  |  |  |
|                                        | Thallium (Tl)-Total (mg/kg wwt)   |              |        |  |  |  |
|                                        | Tin (Sn)-Total (mg/kg)            |              |        |  |  |  |
|                                        | Tin (Sn)-Total (mg/kg wwt)        |              |        |  |  |  |
|                                        | Uranium (U)-Total (mg/kg)         |              |        |  |  |  |
|                                        | Uranium (U)-Total (mg/kg wwt)     |              |        |  |  |  |
|                                        | Vanadium (V)-Total (mg/kg)        |              |        |  |  |  |
|                                        | Vanadium (V)-Total (mg/kg wwt)    |              |        |  |  |  |
|                                        | Zinc (Zn)-Total (mg/kg)           |              |        |  |  |  |
|                                        | Zinc (Zn)-Total (mg/kg wwt)       |              |        |  |  |  |
| Polycyclic<br>Aromatic<br>Hydrocarbons | Acenaphthene (mg/kg)              | <0.050       | <0.10  |  |  |  |
|                                        | Acenaphthene (mg/kg wwt)          | <0.010       | <0.020 |  |  |  |
|                                        | Acenaphthylene (mg/kg)            | <0.050       | <0.10  |  |  |  |
|                                        | Acenaphthylene (mg/kg wwt)        | <0.010       | <0.020 |  |  |  |
|                                        | Anthracene (mg/kg)                | <0.050       | <0.10  |  |  |  |
|                                        | Anthracene (mg/kg wwt)            | <0.010       | <0.030 |  |  |  |
|                                        | Benz(a)anthracene (mg/kg)         | <0.050       | <0.10  |  |  |  |
|                                        | Benz(a)anthracene (mg/kg wwt)     | <0.010       | <0.020 |  |  |  |
|                                        | Benzo(a)pyrene (mg/kg)            | <0.050       | <0.10  |  |  |  |
|                                        | Benzo(a)pyrene (mg/kg wwt)        | <0.010       | <0.020 |  |  |  |
|                                        | Benzo(b)fluoranthene (mg/kg)      | <0.050       | <0.10  |  |  |  |
|                                        | Benzo(b)fluoranthene (mg/kg wwt)  | <0.010       | <0.020 |  |  |  |
|                                        | Benzo(g,h,i)perylene (mg/kg)      | <0.050       | <0.30  |  |  |  |
|                                        | Benzo(g,h,i)perylene (mg/kg wwt)  | <0.030       | <0.070 |  |  |  |
|                                        | Benzo(k)fluoranthene (mg/kg)      | <0.050       | <0.10  |  |  |  |
|                                        | Benzo(k)fluoranthene (mg/kg wwt)  | <0.010       | <0.020 |  |  |  |
|                                        | Chrysene (mg/kg)                  | <0.050       | <0.10  |  |  |  |
|                                        | Chrysene (mg/kg wwt)              | <0.010       | <0.020 |  |  |  |
|                                        | Dibenz(a,h)anthracene (mg/kg)     | <0.050       | <0.10  |  |  |  |
|                                        | Dibenz(a,h)anthracene (mg/kg wwt) | <0.010       | <0.020 |  |  |  |
|                                        | Fluoranthene (mg/kg)              | <0.050       | <0.10  |  |  |  |
|                                        | Fluoranthene (mg/kg wwt)          | <0.010       | <0.020 |  |  |  |
|                                        | Fluorene (mg/kg)                  | <0.050       | 0.25   |  |  |  |
|                                        | Fluorene (mg/kg wwt)              | <0.010       | 0.062  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L685670-1           | L685670-2           | L685670-3           | L685670-7      | L685670-8      |
|-----------------------------------------------------------------------|---------------------------------------------|---------------------|---------------------|---------------------|----------------|----------------|
|                                                                       |                                             | 27-AUG-08           | 28-AUG-08           | 29-AUG-08           | 26-AUG-08      | 29-AUG-08      |
|                                                                       |                                             | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | YUCA#1 FRUTO M | YUCA#1 FRUTO M |
| Grouping                                                              | Analyte                                     |                     |                     |                     |                |                |
| <b>TISSUE</b>                                                         |                                             |                     |                     |                     |                |                |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                     |                     |                     |                |                |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                     |                     |                     |                |                |
|                                                                       | Naphthalene (mg/kg)                         |                     |                     |                     |                |                |
|                                                                       | Naphthalene (mg/kg wwt)                     |                     |                     |                     |                |                |
|                                                                       | Phenanthrene (mg/kg)                        |                     |                     |                     |                |                |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                     |                     |                     |                |                |
|                                                                       | Pyrene (mg/kg)                              |                     |                     |                     |                |                |
|                                                                       | Pyrene (mg/kg wwt)                          |                     |                     |                     |                |                |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                     |                     |                     |                |                |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                     |                     |                     |                |                |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                     |                     |                     |                |                |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                     |                     |                     |                |                |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1221 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1232 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1242 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1248 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1254 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1260 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1262 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | PCB-1268 (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                     |                     |                     |                |                |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                     |                     |                     |                |                |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                     |                     |                     |                |                |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                     |                     |                     |                |                |
|                                                                       | Aldrin (mg/kg wwt)                          |                     |                     |                     |                |                |
|                                                                       | alpha-BHC (mg/kg)                           |                     |                     |                     |                |                |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                     |                     |                     |                |                |
|                                                                       | beta-BHC (mg/kg)                            |                     |                     |                     |                |                |
|                                                                       | beta-BHC (mg/kg wwt)                        |                     |                     |                     |                |                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L685670-24<br><br>27-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-25<br><br>25-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-26<br><br>27-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-27<br><br>25-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-31<br><br>29-AUG-08<br><br>GUINEO#1<br>LEAVES M |
|-----------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------|
| Grouping                                                              | Analyte                                     |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>TISSUE</b>                                                         |                                             |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Naphthalene (mg/kg)                         |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Phenanthrene (mg/kg)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Pyrene (mg/kg)                              |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Pyrene (mg/kg wwt)                          |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1221 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1232 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1242 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1248 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1254 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1260 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1262 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1268 (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Aldrin (mg/kg wwt)                          |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | alpha-BHC (mg/kg)                           |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | beta-BHC (mg/kg)                            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                                       |                                                       |                                                        |                                                        |                                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L685670-32<br><br>27-AUG-08<br><br>GUINEO#1<br>LEAVES M | L685670-33<br><br>28-AUG-08<br><br>GUINEO#1<br>LEAVES M | L685670-37<br><br>29-AUG-08<br><br>YUCA#1 LEAVES<br>M | L685670-38<br><br>26-AUG-08<br><br>YUCA#1 LEAVES<br>M | L685670-41<br><br>29-AUG-08<br><br>YUCA#1 LEAVES<br>O |
|-------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|
| Grouping                                        | Analyte                                     |                                                                       |                                                         |                                                         |                                                       |                                                       |                                                       |
| <b>TISSUE</b>                                   |                                             |                                                                       |                                                         |                                                         |                                                       |                                                       |                                                       |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.075                                                |
|                                                 | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.020                                                |
|                                                 | Naphthalene (mg/kg)                         |                                                                       |                                                         |                                                         |                                                       |                                                       | 0.126                                                 |
|                                                 | Naphthalene (mg/kg wwt)                     |                                                                       |                                                         |                                                         |                                                       |                                                       | 0.038                                                 |
|                                                 | Phenanthrene (mg/kg)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.075                                                |
|                                                 | Phenanthrene (mg/kg wwt)                    |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.020                                                |
|                                                 | Pyrene (mg/kg)                              |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.075                                                |
|                                                 | Pyrene (mg/kg wwt)                          |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.020                                                |
|                                                 | Surrogate: d10-Acenaphthene (SS) (%)        |                                                                       |                                                         |                                                         |                                                       |                                                       | 90                                                    |
|                                                 | Surrogate: d12-Chrysene (SS) (%)            |                                                                       |                                                         |                                                         |                                                       |                                                       | 89                                                    |
|                                                 | Surrogate: d8-Naphthalene (SS) (%)          |                                                                       |                                                         |                                                         |                                                       |                                                       | 90                                                    |
|                                                 | Surrogate: d10-Phenanthrene (SS) (%)        |                                                                       |                                                         |                                                         |                                                       |                                                       | 91                                                    |
| <b>Polychlorinated<br/>Biphenyls</b>            | PCB-1016 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1016 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1221 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1221 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1232 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1232 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1242 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1242 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1248 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1248 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1254 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1254 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1260 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1260 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1262 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1262 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | PCB-1268 (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | PCB-1268 (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.25                                                 |
|                                                 | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
| <b>Organochlorine<br/>Pesticides</b>            | Aldrin (mg/kg)                              |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | Aldrin (mg/kg wwt)                          |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.010                                                |
|                                                 | alpha-BHC (mg/kg)                           |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | alpha-BHC (mg/kg wwt)                       |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.010                                                |
|                                                 | beta-BHC (mg/kg)                            |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.050                                                |
|                                                 | beta-BHC (mg/kg wwt)                        |                                                                       |                                                         |                                                         |                                                       |                                                       | <0.010                                                |

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|                                  |                                             | Sample ID    | L685670-42     | L685670-55       | L685670-56       | L685670-57      | L685670-58      |
|----------------------------------|---------------------------------------------|--------------|----------------|------------------|------------------|-----------------|-----------------|
|                                  |                                             | Description  |                |                  |                  |                 |                 |
|                                  |                                             | Sampled Date | 29-AUG-08      | 27-AUG-08        | 25-AUG-08        | 27-AUG-08       | 25-AUG-08       |
|                                  |                                             | Sampled Time |                |                  |                  |                 |                 |
|                                  |                                             | Client ID    | YUCA#1 FRUTO O | ARROZ#1 LEAVES O | ARROZ#1 LEAVES O | ARROZ#1 GRANO O | ARROZ#1 GRANO O |
| Grouping                         | Analyte                                     |              |                |                  |                  |                 |                 |
| TISSUE                           |                                             |              |                |                  |                  |                 |                 |
| Polycyclic Aromatic Hydrocarbons | Indeno(1,2,3-c,d)pyrene (mg/kg)             | <0.075       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         | <0.010       | <0.020         | <0.020           | <0.020           | <0.030          |                 |
|                                  | Naphthalene (mg/kg)                         | <0.075       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Naphthalene (mg/kg wwt)                     | <0.010       | <0.020         | <0.020           | <0.020           | <0.030          |                 |
|                                  | Phenanthrene (mg/kg)                        | <0.075       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Phenanthrene (mg/kg wwt)                    | <0.010       | <0.020         | <0.020           | <0.020           | <0.030          |                 |
|                                  | Pyrene (mg/kg)                              | <0.075       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Pyrene (mg/kg wwt)                          | <0.010       | <0.020         | <0.020           | <0.020           | <0.030          |                 |
|                                  | Surrogate: d10-Acenaphthene (SS) (%)        | 100          | 94             | 96               | 95               | 94              |                 |
|                                  | Surrogate: d12-Chrysene (SS) (%)            | 97           | 96             | 95               | 94               | 94              |                 |
|                                  | Surrogate: d8-Naphthalene (SS) (%)          | 97           | 93             | 91               | 93               | 92              |                 |
|                                  | Surrogate: d10-Phenanthrene (SS) (%)        | 99           | 95             | 94               | 97               | 98              |                 |
| Polychlorinated Biphenyls        | PCB-1016 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1016 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1221 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1221 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1232 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1232 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1242 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1242 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1248 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1248 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1254 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1254 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1260 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1260 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1262 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1262 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | PCB-1268 (mg/kg)                            | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | PCB-1268 (mg/kg wwt)                        | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Total Polychlorinated Biphenyls (mg/kg)     | <0.25        | <0.25          | <0.25            | <0.25            | <0.25           |                 |
|                                  | Total Polychlorinated Biphenyls (mg/kg wwt) | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
| Organochlorine Pesticides        | Aldrin (mg/kg)                              | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | Aldrin (mg/kg wwt)                          | <0.010       | <0.010         | <0.010           | <0.010           | <0.010          |                 |
|                                  | alpha-BHC (mg/kg)                           | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | alpha-BHC (mg/kg wwt)                       | <0.010       | <0.010         | <0.010           | <0.010           | <0.010          |                 |
|                                  | beta-BHC (mg/kg)                            | <0.050       | <0.050         | <0.050           | <0.050           | <0.050          |                 |
|                                  | beta-BHC (mg/kg wwt)                        | <0.010       | <0.010         | <0.010           | <0.010           | <0.010          |                 |

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|                                                 |                                             | Sample ID              |                |  |  |  |
|-------------------------------------------------|---------------------------------------------|------------------------|----------------|--|--|--|
|                                                 |                                             | Description            |                |  |  |  |
|                                                 |                                             | Sampled Date           |                |  |  |  |
|                                                 |                                             | Sampled Time           |                |  |  |  |
|                                                 |                                             | Client ID              |                |  |  |  |
|                                                 |                                             | L685670-72             | L685670-73     |  |  |  |
|                                                 |                                             | 26-AUG-08              | 26-AUG-08      |  |  |  |
|                                                 |                                             | YUCA#1 RAIZ<br>ROOTS O | YUCA#1 HOJAS O |  |  |  |
| Grouping                                        | Analyte                                     |                        |                |  |  |  |
| <b>TISSUE</b>                                   |                                             |                        |                |  |  |  |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Indeno(1,2,3-c,d)pyrene (mg/kg)             | <0.050                 | <0.10          |  |  |  |
|                                                 | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         | <0.010                 | <0.020         |  |  |  |
|                                                 | Naphthalene (mg/kg)                         | <0.050                 | <0.10          |  |  |  |
|                                                 | Naphthalene (mg/kg wwt)                     | <0.010                 | <0.020         |  |  |  |
|                                                 | Phenanthrene (mg/kg)                        | <0.050                 | <0.10          |  |  |  |
|                                                 | Phenanthrene (mg/kg wwt)                    | <0.010                 | <0.020         |  |  |  |
|                                                 | Pyrene (mg/kg)                              | <0.050                 | <0.10          |  |  |  |
|                                                 | Pyrene (mg/kg wwt)                          | <0.010                 | <0.020         |  |  |  |
|                                                 | Surrogate: d10-Acenaphthene (SS) (%)        | 93                     | 93             |  |  |  |
|                                                 | Surrogate: d12-Chrysene (SS) (%)            | 92                     | 94             |  |  |  |
|                                                 | Surrogate: d8-Naphthalene (SS) (%)          | 91                     | 90             |  |  |  |
|                                                 | Surrogate: d10-Phenanthrene (SS) (%)        | 94                     | 92             |  |  |  |
| <b>Polychlorinated<br/>Biphenyls</b>            | PCB-1016 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1016 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1221 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1221 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1232 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1232 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1242 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1242 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1248 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1248 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1254 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1254 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1260 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1260 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1262 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1262 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | PCB-1268 (mg/kg)                            | <0.25                  | <0.25          |  |  |  |
|                                                 | PCB-1268 (mg/kg wwt)                        | <0.050                 | <0.050         |  |  |  |
|                                                 | Total Polychlorinated Biphenyls (mg/kg)     | <0.25                  | <0.25          |  |  |  |
|                                                 | Total Polychlorinated Biphenyls (mg/kg wwt) | <0.050                 | <0.050         |  |  |  |
| <b>Organochlorine<br/>Pesticides</b>            | Aldrin (mg/kg)                              | <0.050                 | <0.050         |  |  |  |
|                                                 | Aldrin (mg/kg wwt)                          | <0.010                 | <0.010         |  |  |  |
|                                                 | alpha-BHC (mg/kg)                           | <0.050                 | <0.050         |  |  |  |
|                                                 | alpha-BHC (mg/kg wwt)                       | <0.010                 | <0.010         |  |  |  |
|                                                 | beta-BHC (mg/kg)                            | <0.050                 | <0.050         |  |  |  |
|                                                 | beta-BHC (mg/kg wwt)                        | <0.010                 | <0.010         |  |  |  |

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| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L685670-1           | L685670-2           | L685670-3           | L685670-7      | L685670-8      |
|-----------------------------------------------------------------------|-------------------------------------|---------------------|---------------------|---------------------|----------------|----------------|
|                                                                       |                                     | 27-AUG-08           | 28-AUG-08           | 29-AUG-08           | 26-AUG-08      | 29-AUG-08      |
|                                                                       |                                     | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | YUCA#1 FRUTO M | YUCA#1 FRUTO M |
| Grouping                                                              | Analyte                             |                     |                     |                     |                |                |
| <b>TISSUE</b>                                                         |                                     |                     |                     |                     |                |                |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                     |                     |                     |                |                |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                     |                     |                     |                |                |
|                                                                       | delta-BHC (mg/kg)                   |                     |                     |                     |                |                |
|                                                                       | delta-BHC (mg/kg wwt)               |                     |                     |                     |                |                |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                     |                     |                     |                |                |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                     |                     |                     |                |                |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                     |                     |                     |                |                |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDD (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDD (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDE (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDE (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDT (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDT (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | Dieldrin (mg/kg)                    |                     |                     |                     |                |                |
|                                                                       | Dieldrin (mg/kg wwt)                |                     |                     |                     |                |                |
|                                                                       | Endosulfan I (mg/kg)                |                     |                     |                     |                |                |
|                                                                       | Endosulfan I (mg/kg wwt)            |                     |                     |                     |                |                |
|                                                                       | Endosulfan II (mg/kg)               |                     |                     |                     |                |                |
|                                                                       | Endosulfan II (mg/kg wwt)           |                     |                     |                     |                |                |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                     |                     |                     |                |                |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                     |                     |                     |                |                |
|                                                                       | Endrin (mg/kg)                      |                     |                     |                     |                |                |
|                                                                       | Endrin (mg/kg wwt)                  |                     |                     |                     |                |                |
|                                                                       | Heptachlor (mg/kg)                  |                     |                     |                     |                |                |
|                                                                       | Heptachlor (mg/kg wwt)              |                     |                     |                     |                |                |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                     |                     |                     |                |                |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                     |                     |                     |                |                |
|                                                                       | Methoxychlor (mg/kg)                |                     |                     |                     |                |                |
|                                                                       | Methoxychlor (mg/kg wwt)            |                     |                     |                     |                |                |
|                                                                       | Mirex (mg/kg)                       |                     |                     |                     |                |                |
|                                                                       | Mirex (mg/kg wwt)                   |                     |                     |                     |                |                |
|                                                                       | cis-Nonachlor (mg/kg)               |                     |                     |                     |                |                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L685670-24<br><br>27-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-25<br><br>25-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-26<br><br>27-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-27<br><br>25-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-31<br><br>29-AUG-08<br><br>GUINEO#1<br>LEAVES M |
|-----------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------|
| Grouping                                                              | Analyte                             |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>TISSUE</b>                                                         |                                     |                                                       |                                                       |                                                        |                                                        |                                                         |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | delta-BHC (mg/kg)                   |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | delta-BHC (mg/kg wwt)               |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Dieldrin (mg/kg)                    |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Dieldrin (mg/kg wwt)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan I (mg/kg)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan II (mg/kg)               |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endrin (mg/kg)                      |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Endrin (mg/kg wwt)                  |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Heptachlor (mg/kg)                  |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Heptachlor (mg/kg wwt)              |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Methoxychlor (mg/kg)                |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Mirex (mg/kg)                       |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Mirex (mg/kg wwt)                   |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | cis-Nonachlor (mg/kg)               |                                                       |                                                       |                                                        |                                                        |                                                         |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L685670-32           | L685670-33           | L685670-37         | L685670-38         | L685670-41         |
|-----------------------------------------------------------------------|-------------------------------------|----------------------|----------------------|--------------------|--------------------|--------------------|
|                                                                       |                                     | 27-AUG-08            | 28-AUG-08            | 29-AUG-08          | 26-AUG-08          | 29-AUG-08          |
|                                                                       |                                     | GUINEO#1<br>LEAVES M | GUINEO#1<br>LEAVES M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>M | YUCA#1 LEAVES<br>O |
| Grouping                                                              | Analyte                             |                      |                      |                    |                    |                    |
| <b>TISSUE</b>                                                         |                                     |                      |                      |                    |                    |                    |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                      |                      |                    |                    | <0.050             |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                      |                      |                    |                    | <0.010             |
|                                                                       | delta-BHC (mg/kg)                   |                      |                      |                    |                    | <0.050             |
|                                                                       | delta-BHC (mg/kg wwt)               |                      |                      |                    |                    | <0.010             |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                      |                      |                    |                    | <0.050             |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                      |                      |                    |                    | <0.010             |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                      |                      |                    |                    | <0.050             |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                      |                      |                    |                    | <0.010             |
|                                                                       | 2,4'-DDD (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | 4,4'-DDD (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | 2,4'-DDE (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | 4,4'-DDE (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | 2,4'-DDT (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | 4,4'-DDT (mg/kg)                    |                      |                      |                    |                    | <0.050             |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                      |                      |                    |                    | <0.010             |
|                                                                       | Dieldrin (mg/kg)                    |                      |                      |                    |                    | <0.070             |
|                                                                       | Dieldrin (mg/kg wwt)                |                      |                      |                    |                    | <0.020             |
|                                                                       | Endosulfan I (mg/kg)                |                      |                      |                    |                    | <0.070             |
|                                                                       | Endosulfan I (mg/kg wwt)            |                      |                      |                    |                    | <0.020             |
|                                                                       | Endosulfan II (mg/kg)               |                      |                      |                    |                    | <0.070             |
|                                                                       | Endosulfan II (mg/kg wwt)           |                      |                      |                    |                    | <0.020             |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                      |                      |                    |                    | <0.070             |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                      |                      |                    |                    | <0.020             |
|                                                                       | Endrin (mg/kg)                      |                      |                      |                    |                    | <0.070             |
|                                                                       | Endrin (mg/kg wwt)                  |                      |                      |                    |                    | <0.020             |
|                                                                       | Heptachlor (mg/kg)                  |                      |                      |                    |                    | <0.050             |
|                                                                       | Heptachlor (mg/kg wwt)              |                      |                      |                    |                    | <0.010             |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                      |                      |                    |                    | <0.050             |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                      |                      |                    |                    | <0.010             |
|                                                                       | Methoxychlor (mg/kg)                |                      |                      |                    |                    | <0.070             |
|                                                                       | Methoxychlor (mg/kg wwt)            |                      |                      |                    |                    | <0.020             |
|                                                                       | Mirex (mg/kg)                       |                      |                      |                    |                    | <0.050             |
|                                                                       | Mirex (mg/kg wwt)                   |                      |                      |                    |                    | <0.010             |
|                                                                       | cis-Nonachlor (mg/kg)               |                      |                      |                    |                    | <0.050             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L685670-42     | L685670-55          | L685670-56          | L685670-57         | L685670-58         |
|-----------------------------------------------------------------------|-------------------------------------|----------------|---------------------|---------------------|--------------------|--------------------|
|                                                                       |                                     | 29-AUG-08      | 27-AUG-08           | 25-AUG-08           | 27-AUG-08          | 25-AUG-08          |
|                                                                       |                                     | YUCA#1 FRUTO O | ARROZ#1 LEAVES<br>O | ARROZ#1 LEAVES<br>O | ARROZ#1 GRANO<br>O | ARROZ#1 GRANO<br>O |
| Grouping                                                              | Analyte                             |                |                     |                     |                    |                    |
| <b>TISSUE</b>                                                         |                                     |                |                     |                     |                    |                    |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | delta-BHC (mg/kg)                   | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | delta-BHC (mg/kg wwt)               | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 2,4'-DDD (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 2,4'-DDD (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 4,4'-DDD (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 4,4'-DDD (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 2,4'-DDE (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 2,4'-DDE (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 4,4'-DDE (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 4,4'-DDE (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 2,4'-DDT (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 2,4'-DDT (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | 4,4'-DDT (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | 4,4'-DDT (mg/kg wwt)                | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | Dieldrin (mg/kg)                    | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Dieldrin (mg/kg wwt)                | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Endosulfan I (mg/kg)                | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Endosulfan I (mg/kg wwt)            | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Endosulfan II (mg/kg)               | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Endosulfan II (mg/kg wwt)           | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Endosulfan Sulfate (mg/kg)          | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Endrin (mg/kg)                      | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Endrin (mg/kg wwt)                  | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Heptachlor (mg/kg)                  | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Heptachlor (mg/kg wwt)              | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | Heptachlor Epoxide (mg/kg)          | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | Methoxychlor (mg/kg)                | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Methoxychlor (mg/kg wwt)            | <0.010         | <0.020              | <0.020              | <0.020             | <0.030             |
|                                                                       | Mirex (mg/kg)                       | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Mirex (mg/kg wwt)                   | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | cis-Nonachlor (mg/kg)               | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                  |                                     | Sample ID    |        |  |  |  |
|----------------------------------|-------------------------------------|--------------|--------|--|--|--|
|                                  |                                     | Description  |        |  |  |  |
|                                  |                                     | Sampled Date |        |  |  |  |
|                                  |                                     | Sampled Time |        |  |  |  |
|                                  |                                     | Client ID    |        |  |  |  |
| Grouping                         | Analyte                             |              |        |  |  |  |
| <b>TISSUE</b>                    |                                     |              |        |  |  |  |
| <b>Organochlorine Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       | <0.050       | <0.050 |  |  |  |
|                                  | Lindane (gamma - BHC) (mg/kg wwt)   | <0.010       | <0.010 |  |  |  |
|                                  | delta-BHC (mg/kg)                   | <0.050       | <0.050 |  |  |  |
|                                  | delta-BHC (mg/kg wwt)               | <0.010       | <0.010 |  |  |  |
|                                  | cis-Chlordane (alpha) (mg/kg)       | <0.050       | <0.050 |  |  |  |
|                                  | cis-Chlordane (alpha) (mg/kg wwt)   | <0.010       | <0.010 |  |  |  |
|                                  | trans-Chlordane (gamma) (mg/kg)     | <0.050       | <0.050 |  |  |  |
|                                  | trans-Chlordane (gamma) (mg/kg wwt) | <0.010       | <0.010 |  |  |  |
|                                  | 2,4'-DDD (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 2,4'-DDD (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | 4,4'-DDD (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 4,4'-DDD (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | 2,4'-DDE (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 2,4'-DDE (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | 4,4'-DDE (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 4,4'-DDE (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | 2,4'-DDT (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 2,4'-DDT (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | 4,4'-DDT (mg/kg)                    | <0.050       | <0.050 |  |  |  |
|                                  | 4,4'-DDT (mg/kg wwt)                | <0.010       | <0.010 |  |  |  |
|                                  | Dieldrin (mg/kg)                    | <0.050       | <0.080 |  |  |  |
|                                  | Dieldrin (mg/kg wwt)                | <0.010       | <0.020 |  |  |  |
|                                  | Endosulfan I (mg/kg)                | <0.050       | <0.080 |  |  |  |
|                                  | Endosulfan I (mg/kg wwt)            | <0.010       | <0.020 |  |  |  |
|                                  | Endosulfan II (mg/kg)               | <0.050       | <0.080 |  |  |  |
|                                  | Endosulfan II (mg/kg wwt)           | <0.010       | <0.020 |  |  |  |
|                                  | Endosulfan Sulfate (mg/kg)          | <0.050       | <0.080 |  |  |  |
|                                  | Endosulfan Sulfate (mg/kg wwt)      | <0.010       | <0.020 |  |  |  |
|                                  | Endrin (mg/kg)                      | <0.050       | <0.080 |  |  |  |
|                                  | Endrin (mg/kg wwt)                  | <0.010       | <0.020 |  |  |  |
|                                  | Heptachlor (mg/kg)                  | <0.050       | <0.050 |  |  |  |
|                                  | Heptachlor (mg/kg wwt)              | <0.010       | <0.010 |  |  |  |
|                                  | Heptachlor Epoxide (mg/kg)          | <0.050       | <0.050 |  |  |  |
|                                  | Heptachlor Epoxide (mg/kg wwt)      | <0.010       | <0.010 |  |  |  |
|                                  | Methoxychlor (mg/kg)                | <0.050       | <0.080 |  |  |  |
|                                  | Methoxychlor (mg/kg wwt)            | <0.010       | <0.020 |  |  |  |
|                                  | Mirex (mg/kg)                       | <0.050       | <0.050 |  |  |  |
|                                  | Mirex (mg/kg wwt)                   | <0.010       | <0.010 |  |  |  |
|                                  | cis-Nonachlor (mg/kg)               | <0.050       | <0.050 |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L685670-1           | L685670-2           | L685670-3           | L685670-7      | L685670-8      |
|-----------------------------------------------------------------------|-----------------------------|---------------------|---------------------|---------------------|----------------|----------------|
| Grouping                                                              |                             | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | GUINEO#1 FRUTO<br>M | YUCA#1 FRUTO M | YUCA#1 FRUTO M |
| Analyte                                                               |                             |                     |                     |                     |                |                |
| TISSUE                                                                |                             |                     |                     |                     |                |                |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                     |                     |                     |                |                |
|                                                                       | trans-Nonachlor (mg/kg)     |                     |                     |                     |                |                |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                     |                     |                     |                |                |
|                                                                       | Oxychlordane (mg/kg)        |                     |                     |                     |                |                |
|                                                                       | Oxychlordane (mg/kg wwt)    |                     |                     |                     |                |                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L685670-24<br><br>27-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-25<br><br>25-AUG-08<br><br>ARROZ#1 GRANO<br>M | L685670-26<br><br>27-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-27<br><br>25-AUG-08<br><br>ARROZ#1 LEAVES<br>M | L685670-31<br><br>29-AUG-08<br><br>GUINEO#1<br>LEAVES M |
|-----------------------------------------------------------------------|-----------------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------|
| Grouping                                                              | Analyte                     |                                                       |                                                       |                                                        |                                                        |                                                         |
| TISSUE                                                                |                             |                                                       |                                                       |                                                        |                                                        |                                                         |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | trans-Nonachlor (mg/kg)     |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Oxychlordane (mg/kg)        |                                                       |                                                       |                                                        |                                                        |                                                         |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                                       |                                                       |                                                        |                                                        |                                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    |  |  |  |        |
|------------------------------|-----------------------------|--------------|--|--|--|--------|
|                              |                             | Description  |  |  |  |        |
|                              |                             | Sampled Date |  |  |  |        |
|                              |                             | Sampled Time |  |  |  |        |
|                              |                             | Client ID    |  |  |  |        |
| Grouping                     | Analyte                     |              |  |  |  |        |
| TISSUE                       |                             |              |  |  |  |        |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   |              |  |  |  | <0.010 |
|                              | trans-Nonachlor (mg/kg)     |              |  |  |  | <0.050 |
|                              | trans-Nonachlor (mg/kg wwt) |              |  |  |  | <0.010 |
|                              | Oxychlordane (mg/kg)        |              |  |  |  | <0.050 |
|                              | Oxychlordane (mg/kg wwt)    |              |  |  |  | <0.010 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L685670-42     | L685670-55          | L685670-56          | L685670-57         | L685670-58         |
|-----------------------------------------------------------------------|-----------------------------|----------------|---------------------|---------------------|--------------------|--------------------|
|                                                                       |                             | 29-AUG-08      | 27-AUG-08           | 25-AUG-08           | 27-AUG-08          | 25-AUG-08          |
|                                                                       |                             | YUCA#1 FRUTO O | ARROZ#1 LEAVES<br>O | ARROZ#1 LEAVES<br>O | ARROZ#1 GRANO<br>O | ARROZ#1 GRANO<br>O |
| Grouping                                                              | Analyte                     |                |                     |                     |                    |                    |
| TISSUE                                                                |                             |                |                     |                     |                    |                    |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | trans-Nonachlor (mg/kg)     | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | trans-Nonachlor (mg/kg wwt) | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |
|                                                                       | Oxychlordane (mg/kg)        | <0.050         | <0.050              | <0.050              | <0.050             | <0.050             |
|                                                                       | Oxychlordane (mg/kg wwt)    | <0.010         | <0.010              | <0.010              | <0.010             | <0.010             |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID    |        |  |  |  |
|------------------------------|-----------------------------|--------------|--------|--|--|--|
|                              |                             | Description  |        |  |  |  |
|                              |                             | Sampled Date |        |  |  |  |
|                              |                             | Sampled Time |        |  |  |  |
|                              |                             | Client ID    |        |  |  |  |
| Grouping                     | Analyte                     |              |        |  |  |  |
| TISSUE                       |                             |              |        |  |  |  |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   | <0.010       | <0.010 |  |  |  |
|                              | trans-Nonachlor (mg/kg)     | <0.050       | <0.050 |  |  |  |
|                              | trans-Nonachlor (mg/kg wwt) | <0.010       | <0.010 |  |  |  |
|                              | Oxychlordane (mg/kg)        | <0.050       | <0.050 |  |  |  |
|                              | Oxychlordane (mg/kg wwt)    | <0.010       | <0.010 |  |  |  |



## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**AG-DRY-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**AG-WET-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-DRY-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-WET-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**HG-CCME-CVAFS-VA** Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-CSR-FULL-ICP-VA** Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Matrix | Test Description                 | Analytical Method Reference(Based On)    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------|------------------------------------------|
| <p>Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                |        |                                  |                                          |
| <b>MET-DRY-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | Metals in Tissue by ICPMS        | PUGET SOUND PROTOCOLS, EPA 6020A         |
| <p>This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).</p>                                                                                                                                                            |        |                                  |                                          |
| <b>MET-WET-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | Metals in Tissue by ICPMS        | PUGET SOUND PROTOCOLS, EPA 6020A         |
| <p>This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).</p>                                                                                                                                                            |        |                                  |                                          |
| <b>MOISTURE-TISS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Tissue | % Moisture in Tissues            | ASTM METHOD D2974-00                     |
| <p>This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                  |                                          |
| <b>MOISTURE-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Soil   | Moisture content                 | ASTM METHOD D2974-00                     |
| <p>This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |                                  |                                          |
| <b>OCP1-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Soil   | OCP-1 in Soil by Soxhlet GCECD   | EPA METHODS 3540, 3545, 3610, 3630, 3660 |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3545, 3610, 3630, 3660 &amp; 8081, published by the United States Environmental Protection Agency (EPA). The procedure uses an automated system (Accelerated Solvent Extractor - ASE) at high temperature and pressure or a Soxhlet system to extract a subsample of the sediment/soil with dichloromethane. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): alumina clean-up, silica gel clean-up and/or sulphur clean-up. The final extract is analysed by dual capillary column gas chromatography with electron capture detection (GC/ECD).</p> |        |                                  |                                          |
| <b>OCP1-TDRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270      |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 &amp; 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).</p>                                                                                 |        |                                  |                                          |
| <b>OCP1-TWET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270      |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 &amp; 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).</p>                                                                                 |        |                                  |                                          |
| <b>PAH-SURR-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Soil   | PAH Surrogates for Soils         | EPA METHODS 3570, 3545A & 8270           |
| <b>PAH-T-DRY-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270            |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 &amp; 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.</p>                                               |        |                                  |                                          |
| <b>PAH-T-WET-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270            |

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Matrix | Test Description                 | Analytical Method Reference(Based On)    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------|------------------------------------------|
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 &amp; 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.</p>                                                               |        |                                  |                                          |
| <b>PAH-TUMB-H/A-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Soil   | PAH by Tumbler HEX/ACE with GCMS | EPA METHODS 3570 & 8270.                 |
| <p>Polycyclic Aromatic Hydrocarbons in Sediment/Soil<br/>         This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 &amp; 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.</p>                                                       |        |                                  |                                          |
| <b>PCB-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Soil   | PCBs in Soil by Soxhlet ECD      | EPA METHODS 3540, 3620, 3630, 3665, 8082 |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3620, 3630, 3665 &amp; 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane soxhlet extraction of a subsample of the sediment/soil which has been dried with anhydrous sodium sulphate. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): florisil clean-up, silica gel clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).</p>                                                                   |        |                                  |                                          |
| <b>PCB-T-DRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082           |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, &amp; 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).</p>                                                                                                                                                                                            |        |                                  |                                          |
| <b>PCB-T-WET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082           |
| <p>This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, &amp; 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).</p>                                                                                                                                                                                            |        |                                  |                                          |
| <b>PH-1:2-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Soil   | CSR pH by 1:2 Water Leach        | BC WLAP METHOD: PH, ELECTROMETRIC, SOIL  |
| <p>This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at &lt;60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.</p>                                                                                                                                                                                                                                                                                                                |        |                                  |                                          |
| <b>SE-DRY-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                    |
| <p>This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).</p>                                                                                                                                                                                 |        |                                  |                                          |
| <b>SE-WET-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                    |
| <p>This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).</p>                                                                                                                                                                                 |        |                                  |                                          |
| <b>TL-CSR-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Soil   | ICPMS TI in Soil by CSR SALM     | BCMELP CSR SALM Method 8                 |
| <p>This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method</p> |        |                                  |                                          |

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location | Laboratory Definition Code | Laboratory Location |
|----------------------------|---------------------|----------------------------|---------------------|
|----------------------------|---------------------|----------------------------|---------------------|

|    |                                              |
|----|----------------------------------------------|
| VA | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |
|----|----------------------------------------------|

### GLOSSARY OF REPORT TERMS

*Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.*

*The reported surrogate recovery value provides a measure of method efficiency.*

*mg/kg (units) - unit of concentration based on mass, parts per million*

*mg/L (units) - unit of concentration based on volume, parts per million*

*N/A - Result not available. Refer to qualifier code and definition for explanation*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.*

*ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.*



**Environmental Division**

# ALS Laboratory Group Quality Control Report

Workorder: L685670

Report Date: 06-MAY-09

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Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: ADRIAN DE BRUYN

| Test                       | Matrix         | Reference              | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|---------|-----------|-------|-----|--------|-----------|
| <b>HG-CCME-CVAFS-VA</b>    |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R738504</b> |                        |         |           |       |     |        |           |
| <b>WG847412-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 110     |           | %     |     | 86-139 | 08-OCT-08 |
| <b>WG847412-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 97      |           | %     |     | 85-116 | 08-OCT-08 |
| <b>WG847546-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 112     |           | %     |     | 86-139 | 08-OCT-08 |
| <b>WG847546-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 103     |           | %     |     | 85-116 | 08-OCT-08 |
| <b>WG847546-3</b>          | <b>DUP</b>     | <b>L685670-17</b>      |         |           |       |     |        |           |
| Mercury (Hg)               |                | 0.0701                 | 0.0685  |           | mg/kg | 2.3 | 30     | 08-OCT-08 |
| <b>WG847412-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 08-OCT-08 |
| <b>WG847412-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 08-OCT-08 |
| <b>WG847546-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 08-OCT-08 |
| <b>WG847546-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 08-OCT-08 |
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R738799</b> |                        |         |           |       |     |        |           |
| <b>WG847412-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Arsenic (As)               |                |                        | 97      |           | %     |     | 83-117 | 08-OCT-08 |
| Barium (Ba)                |                |                        | 13      |           | %     |     | 11-14  | 08-OCT-08 |
| Beryllium (Be)             |                |                        | 31      | RM-H      | %     |     | 18-22  | 08-OCT-08 |
| Chromium (Cr)              |                |                        | 45      |           | %     |     | 39-50  | 08-OCT-08 |
| Cobalt (Co)                |                |                        | 73      |           | %     |     | 67-77  | 08-OCT-08 |
| Copper (Cu)                |                |                        | 104     |           | %     |     | 93-112 | 08-OCT-08 |
| Nickel (Ni)                |                |                        | 71      |           | %     |     | 59-95  | 08-OCT-08 |
| Vanadium (V)               |                |                        | 60      |           | %     |     | 53-68  | 08-OCT-08 |
| Zinc (Zn)                  |                |                        | 70      |           | %     |     | 66-81  | 08-OCT-08 |
| <b>WG847412-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Arsenic (As)               |                |                        | 103     |           | %     |     | 91-115 | 08-OCT-08 |
| Beryllium (Be)             |                |                        | 30      | RM-H      | %     |     | 10-20  | 08-OCT-08 |
| Cadmium (Cd)               |                |                        | 110     |           | %     |     | 80-148 | 08-OCT-08 |
| Chromium (Cr)              |                |                        | 57      |           | %     |     | 52-58  | 08-OCT-08 |
| Cobalt (Co)                |                |                        | 77      |           | %     |     | 70-79  | 08-OCT-08 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R738799</b> |                        |        |           |       |     |        |           |
| <b>WG847412-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Copper (Cu)                |                |                        | 108    |           | %     |     | 95-115 | 08-OCT-08 |
| Lead (Pb)                  |                |                        | 95     |           | %     |     | 85-109 | 08-OCT-08 |
| Nickel (Ni)                |                |                        | 80     |           | %     |     | 74-88  | 08-OCT-08 |
| Tin (Sn)                   |                |                        | 105    |           | %     |     | 77-116 | 08-OCT-08 |
| Vanadium (V)               |                |                        | 61     |           | %     |     | 56-64  | 08-OCT-08 |
| Zinc (Zn)                  |                |                        | 97     |           | %     |     | 89-107 | 08-OCT-08 |
| <b>WG847546-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Arsenic (As)               |                |                        | 98     |           | %     |     | 83-117 | 08-OCT-08 |
| Barium (Ba)                |                |                        | 13     |           | %     |     | 11-14  | 08-OCT-08 |
| Beryllium (Be)             |                |                        | 32     | RM-H      | %     |     | 18-22  | 08-OCT-08 |
| Chromium (Cr)              |                |                        | 45     |           | %     |     | 39-50  | 08-OCT-08 |
| Cobalt (Co)                |                |                        | 76     |           | %     |     | 67-77  | 08-OCT-08 |
| Copper (Cu)                |                |                        | 107    |           | %     |     | 93-112 | 08-OCT-08 |
| Nickel (Ni)                |                |                        | 73     |           | %     |     | 59-95  | 08-OCT-08 |
| Vanadium (V)               |                |                        | 63     |           | %     |     | 53-68  | 08-OCT-08 |
| Zinc (Zn)                  |                |                        | 71     |           | %     |     | 66-81  | 08-OCT-08 |
| <b>WG847546-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Arsenic (As)               |                |                        | 100    |           | %     |     | 91-115 | 08-OCT-08 |
| Beryllium (Be)             |                |                        | 30     | RM-H      | %     |     | 10-20  | 08-OCT-08 |
| Cadmium (Cd)               |                |                        | 110    |           | %     |     | 80-148 | 08-OCT-08 |
| Chromium (Cr)              |                |                        | 55     |           | %     |     | 52-58  | 08-OCT-08 |
| Cobalt (Co)                |                |                        | 77     |           | %     |     | 70-79  | 08-OCT-08 |
| Copper (Cu)                |                |                        | 106    |           | %     |     | 95-115 | 08-OCT-08 |
| Lead (Pb)                  |                |                        | 91     |           | %     |     | 85-109 | 08-OCT-08 |
| Nickel (Ni)                |                |                        | 79     |           | %     |     | 74-88  | 08-OCT-08 |
| Tin (Sn)                   |                |                        | 107    |           | %     |     | 77-116 | 08-OCT-08 |
| Vanadium (V)               |                |                        | 60     |           | %     |     | 56-64  | 08-OCT-08 |
| Zinc (Zn)                  |                |                        | 94     |           | %     |     | 89-107 | 08-OCT-08 |
| <b>WG847546-3</b>          | <b>DUP</b>     | <b>L685670-17</b>      |        |           |       |     |        |           |
| Antimony (Sb)              |                | <10                    | <10    | RPD-NA    | mg/kg | N/A | 30     | 08-OCT-08 |
| Arsenic (As)               |                | <5.0                   | <5.0   | RPD-NA    | mg/kg | N/A | 30     | 08-OCT-08 |
| Barium (Ba)                |                | 6.0                    | 5.6    | J         | mg/kg | 0.5 | 4      | 08-OCT-08 |
| Beryllium (Be)             |                | <0.50                  | <0.50  | RPD-NA    | mg/kg | N/A | 30     | 08-OCT-08 |
| Cadmium (Cd)               |                | <0.50                  | <0.50  | RPD-NA    | mg/kg | N/A | 30     | 08-OCT-08 |

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| Test                       | Matrix         | Reference         | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>       |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R738799</b> |                   |        |           |       |     |       |           |
| <b>WG847546-3</b>          | <b>DUP</b>     | <b>L685670-17</b> |        |           |       |     |       |           |
| Chromium (Cr)              |                | 5.1               | 5.4    | J         | mg/kg | 0.2 | 8     | 08-OCT-08 |
| Cobalt (Co)                |                | <2.0              | <2.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Copper (Cu)                |                | 6.0               | 5.8    | J         | mg/kg | 0.2 | 4     | 08-OCT-08 |
| Lead (Pb)                  |                | 87                | 90     | J         | mg/kg | 3   | 120   | 08-OCT-08 |
| Molybdenum (Mo)            |                | <4.0              | <4.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Nickel (Ni)                |                | <5.0              | <5.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Selenium (Se)              |                | <2.0              | <2.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Silver (Ag)                |                | <2.0              | <2.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Tin (Sn)                   |                | <5.0              | <5.0   | RPD-NA    | mg/kg | N/A | 30    | 08-OCT-08 |
| Vanadium (V)               |                | 35.1              | 36.9   |           | mg/kg | 5.1 | 30    | 08-OCT-08 |
| Zinc (Zn)                  |                | 15.3              | 14.9   |           | mg/kg | 2.7 | 30    | 08-OCT-08 |
| <b>WG847412-1</b>          | <b>MB</b>      |                   |        |           |       |     |       |           |
| Antimony (Sb)              |                |                   | <10    |           | mg/kg |     | 10    | 08-OCT-08 |
| Arsenic (As)               |                |                   | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Barium (Ba)                |                |                   | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Beryllium (Be)             |                |                   | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Cadmium (Cd)               |                |                   | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Chromium (Cr)              |                |                   | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Cobalt (Co)                |                |                   | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Copper (Cu)                |                |                   | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Lead (Pb)                  |                |                   | <30    |           | mg/kg |     | 30    | 08-OCT-08 |
| Molybdenum (Mo)            |                |                   | <4.0   |           | mg/kg |     | 4     | 08-OCT-08 |
| Nickel (Ni)                |                |                   | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Selenium (Se)              |                |                   | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Silver (Ag)                |                |                   | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Tin (Sn)                   |                |                   | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Vanadium (V)               |                |                   | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Zinc (Zn)                  |                |                   | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| <b>WG847412-2</b>          | <b>MB</b>      |                   |        |           |       |     |       |           |
| Antimony (Sb)              |                |                   | <10    |           | mg/kg |     | 10    | 08-OCT-08 |
| Arsenic (As)               |                |                   | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Barium (Ba)                |                |                   | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Beryllium (Be)             |                |                   | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Cadmium (Cd)               |                |                   | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |

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| Test                       | Matrix         | Reference   | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b> |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R738799</b> |             |        |           |       |     |       |           |
| <b>WG847412-2</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 08-OCT-08 |
| Molybdenum (Mo)            |                |             | <4.0   |           | mg/kg |     | 4     | 08-OCT-08 |
| Nickel (Ni)                |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Selenium (Se)              |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Silver (Ag)                |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Tin (Sn)                   |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Vanadium (V)               |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Zinc (Zn)                  |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| <b>WG847546-1</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 08-OCT-08 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Cadmium (Cd)               |                |             | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 08-OCT-08 |
| Molybdenum (Mo)            |                |             | <4.0   |           | mg/kg |     | 4     | 08-OCT-08 |
| Nickel (Ni)                |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Selenium (Se)              |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Silver (Ag)                |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Tin (Sn)                   |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Vanadium (V)               |                |             | <2.0   |           | mg/kg |     | 2     | 08-OCT-08 |
| Zinc (Zn)                  |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| <b>WG847546-2</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 08-OCT-08 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 08-OCT-08 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 08-OCT-08 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |
| Cadmium (Cd)               |                |             | <0.50  |           | mg/kg |     | 0.5   | 08-OCT-08 |



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| Test                       | Matrix | Reference         | Result  | Qualifier | Units | RPD  | Limit | Analyzed  |
|----------------------------|--------|-------------------|---------|-----------|-------|------|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |        |                   |         |           |       |      |       |           |
| <b>Soil</b>                |        |                   |         |           |       |      |       |           |
| <b>Batch R738799</b>       |        |                   |         |           |       |      |       |           |
| <b>WG847546-2 MB</b>       |        |                   |         |           |       |      |       |           |
| Chromium (Cr)              |        |                   | <2.0    |           | mg/kg |      | 2     | 08-OCT-08 |
| Cobalt (Co)                |        |                   | <2.0    |           | mg/kg |      | 2     | 08-OCT-08 |
| Copper (Cu)                |        |                   | <1.0    |           | mg/kg |      | 1     | 08-OCT-08 |
| Lead (Pb)                  |        |                   | <30     |           | mg/kg |      | 30    | 08-OCT-08 |
| Molybdenum (Mo)            |        |                   | <4.0    |           | mg/kg |      | 4     | 08-OCT-08 |
| Nickel (Ni)                |        |                   | <5.0    |           | mg/kg |      | 5     | 08-OCT-08 |
| Selenium (Se)              |        |                   | <2.0    |           | mg/kg |      | 2     | 08-OCT-08 |
| Silver (Ag)                |        |                   | <2.0    |           | mg/kg |      | 2     | 08-OCT-08 |
| Tin (Sn)                   |        |                   | <5.0    |           | mg/kg |      | 5     | 08-OCT-08 |
| Vanadium (V)               |        |                   | <2.0    |           | mg/kg |      | 2     | 08-OCT-08 |
| Zinc (Zn)                  |        |                   | <1.0    |           | mg/kg |      | 1     | 08-OCT-08 |
| <b>MOISTURE-VA</b>         |        |                   |         |           |       |      |       |           |
| <b>Soil</b>                |        |                   |         |           |       |      |       |           |
| <b>Batch R736815</b>       |        |                   |         |           |       |      |       |           |
| <b>WG847420-1 DUP</b>      |        |                   |         |           |       |      |       |           |
| % Moisture                 |        | <b>L685670-70</b> | 44.5    | 44.4      | %     | 0.36 | 30    | 04-OCT-08 |
| <b>OCP1-SOX-ECD-VA</b>     |        |                   |         |           |       |      |       |           |
| <b>Soil</b>                |        |                   |         |           |       |      |       |           |
| <b>Batch R777586</b>       |        |                   |         |           |       |      |       |           |
| <b>WG892769-3 DUP</b>      |        |                   |         |           |       |      |       |           |
|                            |        | <b>L685670-43</b> |         |           |       |      |       |           |
| alpha-BHC                  |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Lindane (gamma - BHC)      |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| beta-BHC                   |        | <0.0020           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| delta-BHC                  |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Heptachlor                 |        | <0.0020           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Aldrin                     |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Oxychlordane               |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| 2,4'-DDE                   |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Heptachlor Epoxide         |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| trans-Chlordane (gamma)    |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| trans-Nonachlor            |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| cis-Chlordane (alpha)      |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| 4,4'-DDE                   |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| Endosulfan I               |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| 2,4'-DDD                   |        | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |

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| Test                    | Matrix         | Reference         | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|-------------------------|----------------|-------------------|---------|-----------|-------|-----|--------|-----------|
| <b>OCP1-SOX-ECD-VA</b>  |                | <b>Soil</b>       |         |           |       |     |        |           |
| <b>Batch</b>            | <b>R777586</b> |                   |         |           |       |     |        |           |
| <b>WG892769-3</b>       | <b>DUP</b>     | <b>L685670-43</b> |         |           |       |     |        |           |
| Dieldrin                |                | <0.0050           | <0.0050 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| 2,4'-DDT                |                | <0.0020           | <0.0010 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| Endrin                  |                | <0.0050           | <0.0050 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| cis-Nonachlor           |                | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| 4,4'-DDD                |                | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| Endosulfan II           |                | <0.0050           | <0.0050 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| 4,4'-DDT                |                | <0.0020           | <0.0010 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| Methoxychlor            |                | <0.0050           | <0.0050 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| Mirex                   |                | <0.0010           | <0.0010 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| Endosulfan Sulfate      |                | <0.0050           | <0.0050 | RPD-NA    | mg/kg | N/A | 50     | 13-JAN-09 |
| <b>WG892769-2</b>       | <b>LCS</b>     |                   |         |           |       |     |        |           |
| alpha-BHC               |                |                   | 94      |           | %     |     | 55-145 | 13-JAN-09 |
| Lindane (gamma - BHC)   |                |                   | 94      |           | %     |     | 55-145 | 13-JAN-09 |
| beta-BHC                |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| delta-BHC               |                |                   | 95      |           | %     |     | 55-145 | 13-JAN-09 |
| Heptachlor              |                |                   | 94      |           | %     |     | 55-145 | 13-JAN-09 |
| Aldrin                  |                |                   | 99      |           | %     |     | 55-145 | 13-JAN-09 |
| Oxychlordane            |                |                   | 99      |           | %     |     | 55-145 | 13-JAN-09 |
| 2,4'-DDE                |                |                   | 125     |           | %     |     | 55-145 | 13-JAN-09 |
| Heptachlor Epoxide      |                |                   | 94      |           | %     |     | 55-145 | 13-JAN-09 |
| trans-Chlordane (gamma) |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| trans-Nonachlor         |                |                   | 101     |           | %     |     | 55-145 | 13-JAN-09 |
| cis-Chlordane (alpha)   |                |                   | 100     |           | %     |     | 55-145 | 13-JAN-09 |
| 4,4'-DDE                |                |                   | 102     |           | %     |     | 55-145 | 13-JAN-09 |
| Endosulfan I            |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| 2,4'-DDD                |                |                   | 101     |           | %     |     | 55-145 | 13-JAN-09 |
| Dieldrin                |                |                   | 103     |           | %     |     | 55-145 | 13-JAN-09 |
| 2,4'-DDT                |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| Endrin                  |                |                   | 107     |           | %     |     | 55-145 | 13-JAN-09 |
| cis-Nonachlor           |                |                   | 102     |           | %     |     | 55-145 | 13-JAN-09 |
| 4,4'-DDD                |                |                   | 101     |           | %     |     | 55-145 | 13-JAN-09 |
| Endosulfan II           |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| 4,4'-DDT                |                |                   | 98      |           | %     |     | 55-145 | 13-JAN-09 |
| Methoxychlor            |                |                   | 120     |           | %     |     | 55-145 | 13-JAN-09 |

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| Test                      | Matrix         | Reference          | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|---------------------------|----------------|--------------------|---------|-----------|-------|-----|--------|-----------|
| <b>OCP1-SOX-ECD-VA</b>    |                | <b>Soil</b>        |         |           |       |     |        |           |
| <b>Batch</b>              | <b>R777586</b> |                    |         |           |       |     |        |           |
| <b>WG892769-2</b>         | <b>LCS</b>     |                    |         |           |       |     |        |           |
| Mirex                     |                |                    | 99      |           | %     |     | 55-145 | 13-JAN-09 |
| Endosulfan Sulfate        |                |                    | 101     |           | %     |     | 55-145 | 13-JAN-09 |
| <b>WG892769-1</b>         | <b>MB</b>      |                    |         |           |       |     |        |           |
| alpha-BHC                 |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Lindane (gamma - BHC)     |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| beta-BHC                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| delta-BHC                 |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Heptachlor                |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Aldrin                    |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Oxychlordane              |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 2,4'-DDE                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Heptachlor Epoxide        |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| trans-Chlordane (gamma)   |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| trans-Nonachlor           |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| cis-Chlordane (alpha)     |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 4,4'-DDE                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Endosulfan I              |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 2,4'-DDD                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Dieldrin                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 2,4'-DDT                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Endrin                    |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| cis-Nonachlor             |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 4,4'-DDD                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Endosulfan II             |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| 4,4'-DDT                  |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Methoxychlor              |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Mirex                     |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| Endosulfan Sulfate        |                |                    | <0.0010 |           | mg/kg |     | 0.001  | 13-JAN-09 |
| <b>PAH-TUMB-H/A-MS-VA</b> |                | <b>Soil</b>        |         |           |       |     |        |           |
| <b>Batch</b>              | <b>R775562</b> |                    |         |           |       |     |        |           |
| <b>WG891614-4</b>         | <b>IRM</b>     | <b>ALS PAH1 RM</b> |         |           |       |     |        |           |
| Acenaphthene              |                |                    | 93      |           | %     |     | 70-130 | 07-JAN-09 |
| Acenaphthylene            |                |                    | 115     |           | %     |     | 70-130 | 07-JAN-09 |
| Anthracene                |                |                    | 109     |           | %     |     | 70-130 | 07-JAN-09 |

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| Test                      | Matrix         | Reference          | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|---------------------------|----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| <b>PAH-TUMB-H/A-MS-VA</b> |                | <b>Soil</b>        |        |           |       |     |        |           |
| <b>Batch</b>              | <b>R775562</b> |                    |        |           |       |     |        |           |
| <b>WG891614-4</b>         | <b>IRM</b>     | <b>ALS PAH1 RM</b> |        |           |       |     |        |           |
| Benz(a)anthracene         |                |                    | 103    |           | %     |     | 70-130 | 07-JAN-09 |
| Benzo(a)pyrene            |                |                    | 98     |           | %     |     | 70-130 | 07-JAN-09 |
| Benzo(b)fluoranthene      |                |                    | 103    |           | %     |     | 70-130 | 07-JAN-09 |
| Benzo(g,h,i)perylene      |                |                    | 101    |           | %     |     | 70-130 | 07-JAN-09 |
| Benzo(k)fluoranthene      |                |                    | 100    |           | %     |     | 70-130 | 07-JAN-09 |
| Chrysene                  |                |                    | 104    |           | %     |     | 70-130 | 07-JAN-09 |
| Dibenz(a,h)anthracene     |                |                    | 108    |           | %     |     | 70-130 | 07-JAN-09 |
| Fluoranthene              |                |                    | 102    |           | %     |     | 70-130 | 07-JAN-09 |
| Fluorene                  |                |                    | 87     |           | %     |     | 70-130 | 07-JAN-09 |
| Indeno(1,2,3-c,d)pyrene   |                |                    | 100    |           | %     |     | 70-130 | 07-JAN-09 |
| 2-Methylnaphthalene       |                |                    | 102    |           | %     |     | 70-130 | 07-JAN-09 |
| Naphthalene               |                |                    | 98     |           | %     |     | 50-130 | 07-JAN-09 |
| Phenanthrene              |                |                    | 102    |           | %     |     | 70-130 | 07-JAN-09 |
| Pyrene                    |                |                    | 101    |           | %     |     | 70-130 | 07-JAN-09 |
| <b>WG891614-1</b>         | <b>MB</b>      |                    |        |           |       |     |        |           |
| Acenaphthene              |                |                    | <0.040 |           | mg/kg |     | 0.04   | 07-JAN-09 |
| Acenaphthylene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Anthracene                |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Benz(a)anthracene         |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Benzo(a)pyrene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Benzo(b)fluoranthene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Benzo(g,h,i)perylene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Benzo(k)fluoranthene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Chrysene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Dibenz(a,h)anthracene     |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Fluoranthene              |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Fluorene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Indeno(1,2,3-c,d)pyrene   |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| 2-Methylnaphthalene       |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Naphthalene               |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Phenanthrene              |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |
| Pyrene                    |                |                    | <0.050 |           | mg/kg |     | 0.05   | 07-JAN-09 |

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| Test                      | Matrix         | Reference          | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|---------------------------|----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| <b>PAH-TUMB-H/A-MS-VA</b> |                | <b>Soil</b>        |        |           |       |     |        |           |
| <b>Batch</b>              | <b>R776500</b> |                    |        |           |       |     |        |           |
| <b>WG892730-4</b>         | <b>IRM</b>     | <b>ALS PAH1 RM</b> |        |           |       |     |        |           |
| Acenaphthene              |                |                    | 96     |           | %     |     | 70-130 | 09-JAN-09 |
| Acenaphthylene            |                |                    | 116    |           | %     |     | 70-130 | 09-JAN-09 |
| Anthracene                |                |                    | 104    |           | %     |     | 70-130 | 09-JAN-09 |
| Benz(a)anthracene         |                |                    | 104    |           | %     |     | 70-130 | 09-JAN-09 |
| Benzo(a)pyrene            |                |                    | 101    |           | %     |     | 70-130 | 09-JAN-09 |
| Benzo(b)fluoranthene      |                |                    | 105    |           | %     |     | 70-130 | 09-JAN-09 |
| Benzo(g,h,i)perylene      |                |                    | 110    |           | %     |     | 70-130 | 09-JAN-09 |
| Benzo(k)fluoranthene      |                |                    | 100    |           | %     |     | 70-130 | 09-JAN-09 |
| Chrysene                  |                |                    | 107    |           | %     |     | 70-130 | 09-JAN-09 |
| Dibenz(a,h)anthracene     |                |                    | 113    |           | %     |     | 70-130 | 09-JAN-09 |
| Fluoranthene              |                |                    | 105    |           | %     |     | 70-130 | 09-JAN-09 |
| Fluorene                  |                |                    | 86     |           | %     |     | 70-130 | 09-JAN-09 |
| Indeno(1,2,3-c,d)pyrene   |                |                    | 106    |           | %     |     | 70-130 | 09-JAN-09 |
| 2-Methylnaphthalene       |                |                    | 109    |           | %     |     | 70-130 | 09-JAN-09 |
| Naphthalene               |                |                    | 108    |           | %     |     | 50-130 | 09-JAN-09 |
| Phenanthrene              |                |                    | 104    |           | %     |     | 70-130 | 09-JAN-09 |
| Pyrene                    |                |                    | 104    |           | %     |     | 70-130 | 09-JAN-09 |
| <b>WG892730-1</b>         | <b>MB</b>      |                    |        |           |       |     |        |           |
| Acenaphthene              |                |                    | <0.040 |           | mg/kg |     | 0.04   | 09-JAN-09 |
| Acenaphthylene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Anthracene                |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Benz(a)anthracene         |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Benzo(a)pyrene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Benzo(b)fluoranthene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Benzo(g,h,i)perylene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Benzo(k)fluoranthene      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Chrysene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Dibenz(a,h)anthracene     |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Fluoranthene              |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Fluorene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Indeno(1,2,3-c,d)pyrene   |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| 2-Methylnaphthalene       |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Naphthalene               |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |
| Phenanthrene              |                |                    | <0.050 |           | mg/kg |     | 0.05   | 09-JAN-09 |

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| Test                            | Matrix  | Reference  | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|---------------------------------|---------|------------|--------|-----------|-------|------|-------|-----------|
| PAH-TUMB-H/A-MS-VA              |         | Soil       |        |           |       |      |       |           |
| Batch                           | R776500 |            |        |           |       |      |       |           |
| WG892730-1                      | MB      |            |        |           |       |      |       |           |
| Pyrene                          |         |            | <0.050 |           | mg/kg |      | 0.05  | 09-JAN-09 |
| PCB-SOX-ECD-VA                  |         | Soil       |        |           |       |      |       |           |
| Batch                           | R777586 |            |        |           |       |      |       |           |
| WG892769-3                      | DUP     | L685670-43 |        |           |       |      |       |           |
| Total Polychlorinated Biphenyls |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1016                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1221                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1232                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1242                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1248                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1254                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1260                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1262                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| PCB-1268                        |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 50    | 13-JAN-09 |
| WG892769-1                      | MB      |            |        |           |       |      |       |           |
| Total Polychlorinated Biphenyls |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1016                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1221                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1232                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1242                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1248                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1254                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1260                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1262                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PCB-1268                        |         |            | <0.010 |           | mg/kg |      | 0.01  | 13-JAN-09 |
| PH-1:2-VA                       |         | Soil       |        |           |       |      |       |           |
| Batch                           | R737622 |            |        |           |       |      |       |           |
| WG847546-3                      | DUP     | L685670-17 |        |           |       |      |       |           |
| pH                              |         | 5.60       | 5.63   |           | pH    | 0.53 | 20    | 06-OCT-08 |

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| Test                   | Matrix         | Reference              | Result  | Qualifier | Units     | RPD    | Limit  | Analyzed  |
|------------------------|----------------|------------------------|---------|-----------|-----------|--------|--------|-----------|
| <b>TL-CSR-MS-VA</b>    |                | <b>Soil</b>            |         |           |           |        |        |           |
| <b>Batch</b>           | <b>R739500</b> |                        |         |           |           |        |        |           |
| <b>WG847546-5</b>      | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |           |        |        |           |
| <b>WG847546-6</b>      | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |           |        |        |           |
| <b>WG847546-3</b>      | <b>DUP</b>     | <b>L685670-17</b>      |         |           |           |        |        |           |
| Thallium (Tl)          |                | <1.0                   | <1.0    | RPD-NA    | mg/kg     | N/A    | 30     | 08-OCT-08 |
| <b>WG847546-1</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Thallium (Tl)          |                |                        | <1.0    |           | mg/kg     |        | 1      | 08-OCT-08 |
| <b>WG847546-2</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Thallium (Tl)          |                |                        | <1.0    |           | mg/kg     |        | 1      | 08-OCT-08 |
| <b>HG-DRY-CVAFS-VA</b> |                | <b>Tissue</b>          |         |           |           |        |        |           |
| <b>Batch</b>           | <b>R778446</b> |                        |         |           |           |        |        |           |
| <b>WG895164-4</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b>    |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | 86      |           | %         |        | 68-114 | 15-JAN-09 |
| <b>WG895164-1</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0050 |           | mg/kg     |        | 0.005  | 15-JAN-09 |
| <b>WG895164-2</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0050 |           | mg/kg     |        | 0.005  | 15-JAN-09 |
| <b>Batch</b>           | <b>R778908</b> |                        |         |           |           |        |        |           |
| <b>WG895211-7</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b>    |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | 88      |           | %         |        | 68-114 | 16-JAN-09 |
| <b>WG895211-8</b>      | <b>DUP</b>     | <b>L685670-33</b>      |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                | 0.0191                 | 0.0352  | J         | mg/kg     | 0.0161 | 0.02   | 16-JAN-09 |
| <b>WG895211-5</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0050 |           | mg/kg     |        | 0.005  | 16-JAN-09 |
| <b>WG895211-6</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0050 |           | mg/kg     |        | 0.005  | 16-JAN-09 |
| <b>HG-WET-CVAFS-VA</b> |                | <b>Tissue</b>          |         |           |           |        |        |           |
| <b>Batch</b>           | <b>R778446</b> |                        |         |           |           |        |        |           |
| <b>WG895164-4</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b>    |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | 86      |           | %         |        | 68-114 | 15-JAN-09 |
| <b>WG895164-1</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0010 |           | mg/kg wwt |        | 0.001  | 15-JAN-09 |
| <b>WG895164-2</b>      | <b>MB</b>      |                        |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | <0.0010 |           | mg/kg wwt |        | 0.001  | 15-JAN-09 |
| <b>Batch</b>           | <b>R778908</b> |                        |         |           |           |        |        |           |
| <b>WG895211-7</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b>    |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                |                        | 88      |           | %         |        | 68-114 | 16-JAN-09 |
| <b>WG895211-8</b>      | <b>DUP</b>     | <b>L685670-33</b>      |         |           |           |        |        |           |
| Mercury (Hg)-Total     |                | 0.0053                 | 0.0098  | J,G       | mg/kg wwt | 0.0045 | 0.004  | 16-JAN-09 |

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| Test                   | Matrix | Reference           | Result  | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------|--------|---------------------|---------|-----------|-----------|-----|--------|-----------|
| <b>HG-WET-CVAFS-VA</b> |        |                     |         |           |           |     |        |           |
| Batch R778908          |        | Tissue              |         |           |           |     |        |           |
| <b>WG895211-5 MB</b>   |        |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |        |                     | <0.0010 |           | mg/kg wwt |     | 0.001  | 16-JAN-09 |
| <b>WG895211-6 MB</b>   |        |                     |         |           |           |     |        |           |
| Mercury (Hg)-Total     |        |                     | <0.0010 |           | mg/kg wwt |     | 0.001  | 16-JAN-09 |
| <b>MET-DRY-MS-VA</b>   |        |                     |         |           |           |     |        |           |
| Batch R778893          |        | Tissue              |         |           |           |     |        |           |
| <b>WG895164-4 CRM</b>  |        | <b>VA-NIST-1515</b> |         |           |           |     |        |           |
| Aluminum (Al)-Total    |        |                     | 91      |           | %         |     | 66-109 | 16-JAN-09 |
| Barium (Ba)-Total      |        |                     | 92      |           | %         |     | 90-113 | 16-JAN-09 |
| Calcium (Ca)-Total     |        |                     | 96      |           | %         |     | 87-116 | 16-JAN-09 |
| Copper (Cu)-Total      |        |                     | 96      |           | %         |     | 83-114 | 16-JAN-09 |
| Lead (Pb)-Total        |        |                     | 97      |           | %         |     | 70-117 | 16-JAN-09 |
| Magnesium (Mg)-Total   |        |                     | 99      |           | %         |     | 85-115 | 16-JAN-09 |
| Manganese (Mn)-Total   |        |                     | 94      |           | %         |     | 89-116 | 16-JAN-09 |
| Strontium (Sr)-Total   |        |                     | 97      |           | %         |     | 89-119 | 16-JAN-09 |
| Zinc (Zn)-Total        |        |                     | 102     |           | %         |     | 84-115 | 16-JAN-09 |
| <b>WG895211-7 CRM</b>  |        | <b>VA-NIST-1515</b> |         |           |           |     |        |           |
| Aluminum (Al)-Total    |        |                     | 94      |           | %         |     | 66-109 | 16-JAN-09 |
| Barium (Ba)-Total      |        |                     | 94      |           | %         |     | 90-113 | 16-JAN-09 |
| Calcium (Ca)-Total     |        |                     | 99      |           | %         |     | 87-116 | 16-JAN-09 |
| Copper (Cu)-Total      |        |                     | 99      |           | %         |     | 83-114 | 16-JAN-09 |
| Lead (Pb)-Total        |        |                     | 100     |           | %         |     | 70-117 | 16-JAN-09 |
| Magnesium (Mg)-Total   |        |                     | 101     |           | %         |     | 85-115 | 16-JAN-09 |
| Manganese (Mn)-Total   |        |                     | 96      |           | %         |     | 89-116 | 16-JAN-09 |
| Strontium (Sr)-Total   |        |                     | 100     |           | %         |     | 89-119 | 16-JAN-09 |
| Zinc (Zn)-Total        |        |                     | 105     |           | %         |     | 84-115 | 16-JAN-09 |
| <b>WG895211-8 DUP</b>  |        | <b>L685670-33</b>   |         |           |           |     |        |           |
| Aluminum (Al)-Total    |        | 67                  | 96      | J         | mg/kg     | 29  | 40     | 16-JAN-09 |
| Antimony (Sb)-Total    |        | <0.050              | <0.050  | RPD-NA    | mg/kg     | N/A | 45     | 16-JAN-09 |
| Arsenic (As)-Total     |        | <0.050              | <0.050  | RPD-NA    | mg/kg     | N/A | 45     | 16-JAN-09 |
| Barium (Ba)-Total      |        | 110                 | 158     |           | mg/kg     | 35  | 45     | 16-JAN-09 |
| Beryllium (Be)-Total   |        | <0.30               | <0.30   | RPD-NA    | mg/kg     | N/A | 45     | 16-JAN-09 |
| Bismuth (Bi)-Total     |        | <0.30               | <0.30   | RPD-NA    | mg/kg     | N/A | 45     | 16-JAN-09 |
| Cadmium (Cd)-Total     |        | <0.030              | <0.030  | RPD-NA    | mg/kg     | N/A | 45     | 16-JAN-09 |
| Calcium (Ca)-Total     |        | 6150                | 8720    |           | mg/kg     | 35  | 45     | 16-JAN-09 |



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| Test                  | Matrix         | Reference         | Result | Qualifier | Units | RPD   | Limit | Analyzed  |
|-----------------------|----------------|-------------------|--------|-----------|-------|-------|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>     |        |           |       |       |       |           |
| <b>Batch</b>          | <b>R778893</b> |                   |        |           |       |       |       |           |
| <b>WG895211-8</b>     | <b>DUP</b>     | <b>L685670-33</b> |        |           |       |       |       |           |
| Chromium (Cr)-Total   |                | 0.95              | 1.31   | J         | mg/kg | 0.35  | 2     | 16-JAN-09 |
| Cobalt (Co)-Total     |                | <0.10             | <0.10  | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Copper (Cu)-Total     |                | 3.20              | 4.69   |           | mg/kg | 38    | 45    | 16-JAN-09 |
| Lead (Pb)-Total       |                | <0.10             | 0.11   | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Lithium (Li)-Total    |                | <0.50             | <0.50  | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Magnesium (Mg)-Total  |                | 2240              | 3130   |           | mg/kg | 33    | 45    | 16-JAN-09 |
| Manganese (Mn)-Total  |                | 1430              | 2040   |           | mg/kg | 35    | 45    | 16-JAN-09 |
| Molybdenum (Mo)-Total |                | 0.067             | 0.101  | J         | mg/kg | 0.033 | 0.2   | 16-JAN-09 |
| Nickel (Ni)-Total     |                | 0.78              | 1.08   | J         | mg/kg | 0.31  | 2     | 16-JAN-09 |
| Strontium (Sr)-Total  |                | 54.2              | 78.4   |           | mg/kg | 36    | 45    | 16-JAN-09 |
| Thallium (Tl)-Total   |                | <0.030            | <0.030 | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Tin (Sn)-Total        |                | <0.20             | <0.20  | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Uranium (U)-Total     |                | <0.010            | <0.010 | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Vanadium (V)-Total    |                | <0.50             | <0.50  | RPD-NA    | mg/kg | N/A   | 45    | 16-JAN-09 |
| Zinc (Zn)-Total       |                | 10.5              | 16.8   | DUP-H     | mg/kg | 46    | 45    | 16-JAN-09 |
| <b>WG895164-1</b>     | <b>MB</b>      |                   |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                |                   | <10    |           | mg/kg |       | 10    | 16-JAN-09 |
| Antimony (Sb)-Total   |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Arsenic (As)-Total    |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Barium (Ba)-Total     |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |                   | <0.30  |           | mg/kg |       | 0.3   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |                   | <0.30  |           | mg/kg |       | 0.3   | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |                   | <0.030 |           | mg/kg |       | 0.03  | 16-JAN-09 |
| Calcium (Ca)-Total    |                |                   | <10    |           | mg/kg |       | 10    | 16-JAN-09 |
| Chromium (Cr)-Total   |                |                   | <0.50  |           | mg/kg |       | 0.5   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |                   | <0.10  |           | mg/kg |       | 0.1   | 16-JAN-09 |
| Copper (Cu)-Total     |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Lead (Pb)-Total       |                |                   | <0.10  |           | mg/kg |       | 0.1   | 16-JAN-09 |
| Lithium (Li)-Total    |                |                   | <0.50  |           | mg/kg |       | 0.5   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |                   | <3.0   |           | mg/kg |       | 3     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |                   | <0.50  |           | mg/kg |       | 0.5   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |                   | <0.050 |           | mg/kg |       | 0.05  | 16-JAN-09 |

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| Test                  | Matrix         | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|-----------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b>  |           |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R778893</b> |           |        |           |       |     |       |           |
| <b>WG895164-1 MB</b>  |                |           |        |           |       |     |       |           |
| Thallium (Tl)-Total   |                |           | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Tin (Sn)-Total        |                |           | <0.20  |           | mg/kg |     | 0.2   | 16-JAN-09 |
| Uranium (U)-Total     |                |           | <0.010 |           | mg/kg |     | 0.01  | 16-JAN-09 |
| Vanadium (V)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Zinc (Zn)-Total       |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| <b>WG895164-2 MB</b>  |                |           |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |           | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Antimony (Sb)-Total   |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Arsenic (As)-Total    |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Barium (Ba)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |           | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |           | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |           | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Calcium (Ca)-Total    |                |           | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Chromium (Cr)-Total   |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |           | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Copper (Cu)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Lead (Pb)-Total       |                |           | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Lithium (Li)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |           | <3.0   |           | mg/kg |     | 3     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Thallium (Tl)-Total   |                |           | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Tin (Sn)-Total        |                |           | <0.20  |           | mg/kg |     | 0.2   | 16-JAN-09 |
| Uranium (U)-Total     |                |           | <0.010 |           | mg/kg |     | 0.01  | 16-JAN-09 |
| Vanadium (V)-Total    |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Zinc (Zn)-Total       |                |           | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| <b>WG895211-5 MB</b>  |                |           |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |           | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Antimony (Sb)-Total   |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Arsenic (As)-Total    |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Barium (Ba)-Total     |                |           | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |

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| Test                  | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b> |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R778893</b> |               |        |           |       |     |       |           |
| <b>WG895211-5</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 16-JAN-09 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 16-JAN-09 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Zinc (Zn)-Total       |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| <b>WG895211-6</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |               | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 16-JAN-09 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 16-JAN-09 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 16-JAN-09 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 16-JAN-09 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 16-JAN-09 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units     | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-----------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |           |     |        |           |
| <b>Batch</b>          | <b>R778893</b> |                     |        |           |           |     |        |           |
| <b>WG895211-6</b>     | <b>MB</b>      |                     |        |           |           |     |        |           |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg     |     | 0.05   | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg     |     | 0.05   | 16-JAN-09 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg     |     | 0.5    | 16-JAN-09 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg     |     | 0.05   | 16-JAN-09 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg     |     | 0.03   | 16-JAN-09 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg     |     | 0.2    | 16-JAN-09 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg     |     | 0.01   | 16-JAN-09 |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg     |     | 0.5    | 16-JAN-09 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg     |     | 0.5    | 16-JAN-09 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |           |     |        |           |
| <b>Batch</b>          | <b>R778881</b> |                     |        |           |           |     |        |           |
| <b>WG895164-4</b>     | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |     |        |           |
| Aluminum (Al)-Total   |                |                     | 91     |           | %         |     | 66-109 | 16-JAN-09 |
| Barium (Ba)-Total     |                |                     | 92     |           | %         |     | 90-113 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |                     | 96     |           | %         |     | 87-116 | 16-JAN-09 |
| Copper (Cu)-Total     |                |                     | 96     |           | %         |     | 83-114 | 16-JAN-09 |
| Lead (Pb)-Total       |                |                     | 97     |           | %         |     | 70-117 | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | 99     |           | %         |     | 85-115 | 16-JAN-09 |
| Manganese (Mn)-Total  |                |                     | 94     |           | %         |     | 89-116 | 16-JAN-09 |
| Strontium (Sr)-Total  |                |                     | 97     |           | %         |     | 89-119 | 16-JAN-09 |
| Zinc (Zn)-Total       |                |                     | 102    |           | %         |     | 84-115 | 16-JAN-09 |
| <b>WG895211-7</b>     | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |     |        |           |
| Aluminum (Al)-Total   |                |                     | 94     |           | %         |     | 66-109 | 16-JAN-09 |
| Barium (Ba)-Total     |                |                     | 94     |           | %         |     | 90-113 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |                     | 99     |           | %         |     | 87-116 | 16-JAN-09 |
| Copper (Cu)-Total     |                |                     | 99     |           | %         |     | 83-114 | 16-JAN-09 |
| Lead (Pb)-Total       |                |                     | 100    |           | %         |     | 70-117 | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | 101    |           | %         |     | 85-115 | 16-JAN-09 |
| Manganese (Mn)-Total  |                |                     | 96     |           | %         |     | 89-116 | 16-JAN-09 |
| Strontium (Sr)-Total  |                |                     | 100    |           | %         |     | 89-119 | 16-JAN-09 |
| Zinc (Zn)-Total       |                |                     | 105    |           | %         |     | 84-115 | 16-JAN-09 |
| <b>WG895211-8</b>     | <b>DUP</b>     | <b>L685670-33</b>   |        |           |           |     |        |           |
| Aluminum (Al)-Total   |                | 18.6                | 26.8   | J         | mg/kg wwt | 8.1 | 16     | 16-JAN-09 |
| Antimony (Sb)-Total   |                | <0.010              | <0.020 | RPD-NA    | mg/kg wwt | N/A | 45     | 16-JAN-09 |

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| Test                  | Matrix         | Reference         | Result  | Qualifier | Units    | RPD  | Limit | Analyzed  |
|-----------------------|----------------|-------------------|---------|-----------|----------|------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>     |         |           |          |      |       |           |
| <b>Batch</b>          | <b>R778881</b> |                   |         |           |          |      |       |           |
| <b>WG895211-8</b>     | <b>DUP</b>     | <b>L685670-33</b> |         |           |          |      |       |           |
| Arsenic (As)-Total    |                | <0.010            | <0.020  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Barium (Ba)-Total     |                | 30.8              | 44.1    |           | mg/kg ww | 35   | 45    | 16-JAN-09 |
| Beryllium (Be)-Total  |                | <0.10             | <0.20   | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Bismuth (Bi)-Total    |                | <0.030            | <0.060  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Cadmium (Cd)-Total    |                | <0.0050           | <0.010  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Calcium (Ca)-Total    |                | 1720              | 2440    |           | mg/kg ww | 35   | 45    | 16-JAN-09 |
| Chromium (Cr)-Total   |                | 0.27              | 0.36    | J         | mg/kg ww | 0.10 | 0.8   | 16-JAN-09 |
| Cobalt (Co)-Total     |                | <0.020            | <0.040  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Copper (Cu)-Total     |                | 0.893             | 1.31    |           | mg/kg ww | 38   | 45    | 16-JAN-09 |
| Lead (Pb)-Total       |                | 0.021             | <0.040  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Lithium (Li)-Total    |                | <0.10             | <0.20   | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Magnesium (Mg)-Total  |                | 625               | 874     |           | mg/kg ww | 33   | 45    | 16-JAN-09 |
| Manganese (Mn)-Total  |                | 400               | 570     |           | mg/kg ww | 35   | 45    | 16-JAN-09 |
| Molybdenum (Mo)-Total |                | 0.019             | 0.028   | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Nickel (Ni)-Total     |                | 0.22              | 0.30    | J         | mg/kg ww | 0.09 | 0.8   | 16-JAN-09 |
| Strontium (Sr)-Total  |                | 15.2              | 21.9    |           | mg/kg ww | 36   | 45    | 16-JAN-09 |
| Thallium (Tl)-Total   |                | <0.010            | <0.020  | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Tin (Sn)-Total        |                | <0.050            | <0.10   | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Uranium (U)-Total     |                | <0.0020           | <0.0040 | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Vanadium (V)-Total    |                | <0.10             | <0.20   | RPD-NA    | mg/kg ww | N/A  | 45    | 16-JAN-09 |
| Zinc (Zn)-Total       |                | 2.94              | 4.69    | DUP-H     | mg/kg ww | 46   | 45    | 16-JAN-09 |
| <b>WG895164-1</b>     | <b>MB</b>      |                   |         |           |          |      |       |           |
| Aluminum (Al)-Total   |                |                   | <2.0    |           | mg/kg ww |      | 2     | 16-JAN-09 |
| Antimony (Sb)-Total   |                |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Arsenic (As)-Total    |                |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Barium (Ba)-Total     |                |                   | 0.017   | MB-LOR    | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |                   | <0.030  |           | mg/kg ww |      | 0.03  | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |                   | <0.0050 |           | mg/kg ww |      | 0.005 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |                   | <2.0    |           | mg/kg ww |      | 2     | 16-JAN-09 |
| Chromium (Cr)-Total   |                |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |                   | <0.020  |           | mg/kg ww |      | 0.02  | 16-JAN-09 |
| Copper (Cu)-Total     |                |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Lead (Pb)-Total       |                |                   | <0.020  |           | mg/kg ww |      | 0.02  | 16-JAN-09 |

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| Test                  | Matrix         | Reference | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|-----------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  | <b>Tissue</b>  |           |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R778881</b> |           |         |           |          |     |       |           |
| <b>WG895164-1 MB</b>  |                |           |         |           |          |     |       |           |
| Lithium (Li)-Total    |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |           | <1.0    |           | mg/kg ww |     | 1     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Thallium (Tl)-Total   |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Tin (Sn)-Total        |                |           | <0.050  |           | mg/kg ww |     | 0.05  | 16-JAN-09 |
| Uranium (U)-Total     |                |           | <0.0020 |           | mg/kg ww |     | 0.002 | 16-JAN-09 |
| Vanadium (V)-Total    |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Zinc (Zn)-Total       |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| <b>WG895164-2 MB</b>  |                |           |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |           | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |
| Antimony (Sb)-Total   |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Arsenic (As)-Total    |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Barium (Ba)-Total     |                |           | 0.027   | MB-LOR    | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |           | <0.030  |           | mg/kg ww |     | 0.03  | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |           | <0.0050 |           | mg/kg ww |     | 0.005 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |           | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |
| Chromium (Cr)-Total   |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |           | <0.020  |           | mg/kg ww |     | 0.02  | 16-JAN-09 |
| Copper (Cu)-Total     |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Lead (Pb)-Total       |                |           | <0.020  |           | mg/kg ww |     | 0.02  | 16-JAN-09 |
| Lithium (Li)-Total    |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |           | <1.0    |           | mg/kg ww |     | 1     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Thallium (Tl)-Total   |                |           | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Tin (Sn)-Total        |                |           | <0.050  |           | mg/kg ww |     | 0.05  | 16-JAN-09 |
| Uranium (U)-Total     |                |           | <0.0020 |           | mg/kg ww |     | 0.002 | 16-JAN-09 |
| Vanadium (V)-Total    |                |           | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R778881</b> |               |         |           |          |     |       |           |
| <b>WG895164-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| <b>WG895211-5</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Barium (Ba)-Total     |                |               | 0.017   | MB-LOR    | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 16-JAN-09 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 16-JAN-09 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 16-JAN-09 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 16-JAN-09 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 16-JAN-09 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| <b>WG895211-6</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Barium (Ba)-Total     |                |               | 0.027   | MB-LOR    | mg/kg ww |     | 0.01  | 16-JAN-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 16-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 16-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 16-JAN-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 16-JAN-09 |

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| Test                        | Matrix | Reference         | Result  | Qualifier | Units    | RPD  | Limit | Analyzed  |
|-----------------------------|--------|-------------------|---------|-----------|----------|------|-------|-----------|
| <b>MET-WET-MS-VA</b>        |        | <b>Tissue</b>     |         |           |          |      |       |           |
| <b>Batch R778881</b>        |        |                   |         |           |          |      |       |           |
| <b>WG895211-6 MB</b>        |        |                   |         |           |          |      |       |           |
| Chromium (Cr)-Total         |        |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Cobalt (Co)-Total           |        |                   | <0.020  |           | mg/kg ww |      | 0.02  | 16-JAN-09 |
| Copper (Cu)-Total           |        |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Lead (Pb)-Total             |        |                   | <0.020  |           | mg/kg ww |      | 0.02  | 16-JAN-09 |
| Lithium (Li)-Total          |        |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Magnesium (Mg)-Total        |        |                   | <1.0    |           | mg/kg ww |      | 1     | 16-JAN-09 |
| Manganese (Mn)-Total        |        |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Molybdenum (Mo)-Total       |        |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Nickel (Ni)-Total           |        |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Strontium (Sr)-Total        |        |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Thallium (Tl)-Total         |        |                   | <0.010  |           | mg/kg ww |      | 0.01  | 16-JAN-09 |
| Tin (Sn)-Total              |        |                   | <0.050  |           | mg/kg ww |      | 0.05  | 16-JAN-09 |
| Uranium (U)-Total           |        |                   | <0.0020 |           | mg/kg ww |      | 0.002 | 16-JAN-09 |
| Vanadium (V)-Total          |        |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| Zinc (Zn)-Total             |        |                   | <0.10   |           | mg/kg ww |      | 0.1   | 16-JAN-09 |
| <b>MOISTURE-TISS-VA</b>     |        | <b>Tissue</b>     |         |           |          |      |       |           |
| <b>Batch R777289</b>        |        |                   |         |           |          |      |       |           |
| <b>WG894537-2 DUP</b>       |        | <b>L685670-24</b> |         |           |          |      |       |           |
| % Moisture                  |        | 50.1              | 50.2    |           | %        | 0.12 | 30    | 13-JAN-09 |
| <b>Batch R777689</b>        |        |                   |         |           |          |      |       |           |
| <b>WG895151-1 DUP</b>       |        | <b>L685670-2</b>  |         |           |          |      |       |           |
| % Moisture                  |        | 80.1              | 77.8    |           | %        | 3.0  | 30    | 14-JAN-09 |
| <b>OCP1-TDRY-SOX-ECD-VA</b> |        | <b>Tissue</b>     |         |           |          |      |       |           |
| <b>Batch R782229</b>        |        |                   |         |           |          |      |       |           |
| <b>WG897870-3 DUP</b>       |        | <b>L685670-41</b> |         |           |          |      |       |           |
| alpha-BHC                   |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| Lindane (gamma - BHC)       |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| beta-BHC                    |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| delta-BHC                   |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| Heptachlor                  |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| Aldrin                      |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |
| Oxychlordane                |        | <0.050            | <0.050  | RPD-NA    | mg/kg    | N/A  | 39    | 26-JAN-09 |



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| Test                               | Matrix         | Reference         | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-------------------|--------|-----------|-----------|-----|-------|-----------|
| <b>OCP1-TDRY-SOX-ECD-VA Tissue</b> |                |                   |        |           |           |     |       |           |
| <b>Batch</b>                       | <b>R782229</b> |                   |        |           |           |     |       |           |
| <b>WG897870-3</b>                  | <b>DUP</b>     | <b>L685670-41</b> |        |           |           |     |       |           |
| 2,4'-DDE                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Heptachlor Epoxide                 |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| trans-Chlordane (gamma)            |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| trans-Nonachlor                    |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| cis-Chlordane (alpha)              |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| 4,4'-DDE                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Endosulfan I                       |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| 2,4'-DDD                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Dieldrin                           |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| 2,4'-DDT                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Endrin                             |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| cis-Nonachlor                      |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| 4,4'-DDD                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Endosulfan II                      |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| 4,4'-DDT                           |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Methoxychlor                       |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Mirex                              |                | <0.050            | <0.050 | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| Endosulfan Sulfate                 |                | <0.070            | <0.10  | RPD-NA    | mg/kg     | N/A | 39    | 26-JAN-09 |
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                   |        |           |           |     |       |           |
| <b>Batch</b>                       | <b>R782228</b> |                   |        |           |           |     |       |           |
| <b>WG897870-3</b>                  | <b>DUP</b>     | <b>L685670-41</b> |        |           |           |     |       |           |
| alpha-BHC                          |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| Lindane (gamma - BHC)              |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| beta-BHC                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| delta-BHC                          |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| Heptachlor                         |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| Aldrin                             |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| Oxychlordane                       |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| 2,4'-DDE                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| Heptachlor Epoxide                 |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| trans-Chlordane (gamma)            |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| trans-Nonachlor                    |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| cis-Chlordane (alpha)              |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |
| 4,4'-DDE                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39    | 26-JAN-09 |

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| Test                               | Matrix         | Reference         | Result | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------------------|----------------|-------------------|--------|-----------|-----------|-----|--------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                   |        |           |           |     |        |           |
| <b>Batch</b>                       | <b>R782228</b> |                   |        |           |           |     |        |           |
| <b>WG897870-3</b>                  | <b>DUP</b>     | <b>L685670-41</b> |        |           |           |     |        |           |
| 4,4'-DDE                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Endosulfan I                       |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| 2,4'-DDD                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Dieldrin                           |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| 2,4'-DDT                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Endrin                             |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| cis-Nonachlor                      |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| 4,4'-DDD                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Endosulfan II                      |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| 4,4'-DDT                           |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Methoxychlor                       |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Mirex                              |                | <0.010            | <0.010 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| Endosulfan Sulfate                 |                | <0.020            | <0.040 | RPD-NA    | mg/kg wwt | N/A | 39     | 26-JAN-09 |
| <b>WG897870-2</b>                  | <b>LCS</b>     |                   |        |           |           |     |        |           |
| alpha-BHC                          |                |                   | 91     |           | %         |     | 50-150 | 26-JAN-09 |
| Lindane (gamma - BHC)              |                |                   | 91     |           | %         |     | 50-150 | 26-JAN-09 |
| beta-BHC                           |                |                   | 92     |           | %         |     | 50-150 | 26-JAN-09 |
| delta-BHC                          |                |                   | 98     |           | %         |     | 50-150 | 26-JAN-09 |
| Heptachlor                         |                |                   | 87     |           | %         |     | 50-150 | 26-JAN-09 |
| Aldrin                             |                |                   | 90     |           | %         |     | 50-150 | 26-JAN-09 |
| Oxychlordane                       |                |                   | 93     |           | %         |     | 50-150 | 26-JAN-09 |
| 2,4'-DDE                           |                |                   | 107    |           | %         |     | 50-150 | 26-JAN-09 |
| Heptachlor Epoxide                 |                |                   | 115    |           | %         |     | 50-150 | 26-JAN-09 |
| trans-Chlordane (gamma)            |                |                   | 93     |           | %         |     | 50-150 | 26-JAN-09 |
| trans-Nonachlor                    |                |                   | 95     |           | %         |     | 50-150 | 26-JAN-09 |
| cis-Chlordane (alpha)              |                |                   | 92     |           | %         |     | 50-150 | 26-JAN-09 |
| 4,4'-DDE                           |                |                   | 95     |           | %         |     | 50-150 | 26-JAN-09 |
| Endosulfan I                       |                |                   | 93     |           | %         |     | 50-150 | 26-JAN-09 |
| 2,4'-DDD                           |                |                   | 95     |           | %         |     | 50-150 | 26-JAN-09 |
| Dieldrin                           |                |                   | 96     |           | %         |     | 50-150 | 26-JAN-09 |
| 2,4'-DDT                           |                |                   | 94     |           | %         |     | 50-150 | 26-JAN-09 |
| Endrin                             |                |                   | 107    |           | %         |     | 50-150 | 26-JAN-09 |
| cis-Nonachlor                      |                |                   | 94     |           | %         |     | 50-150 | 26-JAN-09 |
| 4,4'-DDD                           |                |                   | 95     |           | %         |     | 50-150 | 26-JAN-09 |

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| Test                        | Matrix  | Reference | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------------|---------|-----------|--------|-----------|----------|-----|--------|-----------|
| OCP1-TWET-SOX-ECD-VA Tissue |         |           |        |           |          |     |        |           |
| Batch                       | R782228 |           |        |           |          |     |        |           |
| WG897870-2                  | LCS     |           |        |           |          |     |        |           |
| Endosulfan II               |         |           | 98     |           | %        |     | 50-150 | 26-JAN-09 |
| 4,4'-DDT                    |         |           | 91     |           | %        |     | 50-150 | 26-JAN-09 |
| Methoxychlor                |         |           | 103    |           | %        |     | 50-150 | 26-JAN-09 |
| Mirex                       |         |           | 91     |           | %        |     | 50-150 | 26-JAN-09 |
| Endosulfan Sulfate          |         |           | 133    |           | %        |     | 50-150 | 26-JAN-09 |
| WG897870-1                  | MB      |           |        |           |          |     |        |           |
| alpha-BHC                   |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Lindane (gamma - BHC)       |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| beta-BHC                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| delta-BHC                   |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Heptachlor                  |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Aldrin                      |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Oxychlordane                |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 2,4'-DDE                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Heptachlor Epoxide          |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| trans-Chlordane (gamma)     |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| trans-Nonachlor             |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| cis-Chlordane (alpha)       |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 4,4'-DDE                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Endosulfan I                |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 2,4'-DDD                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Dieldrin                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 2,4'-DDT                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Endrin                      |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| cis-Nonachlor               |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 4,4'-DDD                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Endosulfan II               |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| 4,4'-DDT                    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Methoxychlor                |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Mirex                       |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| Endosulfan Sulfate          |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 26-JAN-09 |
| PAH-T-DRY-SOX-MS-VA Tissue  |         |           |        |           |          |     |        |           |

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| Test                       | Matrix         | Reference         | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------------|--------|-----------|-------|-----|-------|-----------|
| <b>PAH-T-DRY-SOX-MS-VA</b> |                | <b>Tissue</b>     |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R782105</b> |                   |        |           |       |     |       |           |
| <b>WG897870-3</b>          | <b>DUP</b>     | <b>L685670-41</b> |        |           |       |     |       |           |
| Acenaphthene               |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Acenaphthylene             |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Anthracene                 |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Benz(a)anthracene          |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Benzo(a)pyrene             |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Benzo(b)fluoranthene       |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Benzo(g,h,i)perylene       |                | <0.30             | <0.30  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Benzo(k)fluoranthene       |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Chrysene                   |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Dibenz(a,h)anthracene      |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Fluoranthene               |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Fluorene                   |                | <0.30             | <0.30  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene    |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Naphthalene                |                | 0.126             | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Phenanthrene               |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| Pyrene                     |                | <0.075            | <0.15  | RPD-NA    | mg/kg | N/A | 39    | 26-JAN-09 |
| <b>WG897870-1</b>          | <b>MB</b>      |                   |        |           |       |     |       |           |
| Acenaphthene               |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Acenaphthylene             |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Anthracene                 |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Benz(a)anthracene          |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Benzo(a)pyrene             |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Benzo(b)fluoranthene       |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Benzo(g,h,i)perylene       |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Benzo(k)fluoranthene       |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Chrysene                   |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Dibenz(a,h)anthracene      |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Fluoranthene               |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Fluorene                   |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene    |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Naphthalene                |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Phenanthrene               |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |
| Pyrene                     |                |                   | <0.050 |           | mg/kg |     | 0.05  | 26-JAN-09 |

**PAH-T-WET-SOX-MS-VA**      **Tissue**

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| Test                    | Matrix  | Reference  | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-------------------------|---------|------------|--------|-----------|----------|-----|--------|-----------|
| PAH-T-WET-SOX-MS-VA     | Tissue  |            |        |           |          |     |        |           |
| Batch                   | R782105 |            |        |           |          |     |        |           |
| WG897870-3              | DUP     | L685670-41 |        |           |          |     |        |           |
| Acenaphthene            |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Acenaphthylene          |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Anthracene              |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Benz(a)anthracene       |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Benzo(a)pyrene          |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Benzo(b)fluoranthene    |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Benzo(g,h,i)perylene    |         | <0.080     | <0.090 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Benzo(k)fluoranthene    |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Chrysene                |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Dibenz(a,h)anthracene   |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Fluoranthene            |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Fluorene                |         | <0.080     | <0.090 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Naphthalene             |         | 0.038      | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Phenanthrene            |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| Pyrene                  |         | <0.020     | <0.040 | RPD-NA    | mg/kg ww | N/A | 39     | 26-JAN-09 |
| WG897870-2              | LCS     |            |        |           |          |     |        |           |
| Acenaphthene            |         |            | 116    |           | %        |     | 55-145 | 26-JAN-09 |
| Acenaphthylene          |         |            | 116    |           | %        |     | 55-145 | 26-JAN-09 |
| Anthracene              |         |            | 114    |           | %        |     | 55-145 | 26-JAN-09 |
| Benz(a)anthracene       |         |            | 117    |           | %        |     | 55-145 | 26-JAN-09 |
| Benzo(a)pyrene          |         |            | 116    |           | %        |     | 55-145 | 26-JAN-09 |
| Benzo(b)fluoranthene    |         |            | 121    |           | %        |     | 55-145 | 26-JAN-09 |
| Benzo(g,h,i)perylene    |         |            | 128    |           | %        |     | 55-145 | 26-JAN-09 |
| Benzo(k)fluoranthene    |         |            | 123    |           | %        |     | 55-145 | 26-JAN-09 |
| Chrysene                |         |            | 122    |           | %        |     | 55-145 | 26-JAN-09 |
| Dibenz(a,h)anthracene   |         |            | 124    |           | %        |     | 55-145 | 26-JAN-09 |
| Fluoranthene            |         |            | 121    |           | %        |     | 55-145 | 26-JAN-09 |
| Fluorene                |         |            | 118    |           | %        |     | 55-145 | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene |         |            | 124    |           | %        |     | 55-145 | 26-JAN-09 |
| Naphthalene             |         |            | 112    |           | %        |     | 55-145 | 26-JAN-09 |
| Phenanthrene            |         |            | 121    |           | %        |     | 55-145 | 26-JAN-09 |
| Pyrene                  |         |            | 121    |           | %        |     | 55-145 | 26-JAN-09 |
| WG897870-1              | MB      |            |        |           |          |     |        |           |

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| Test                               | Matrix | Reference | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|--------|-----------|--------|-----------|----------|-----|-------|-----------|
| <b>PAH-T-WET-SOX-MS-VA Tissue</b>  |        |           |        |           |          |     |       |           |
| <b>Batch R782105</b>               |        |           |        |           |          |     |       |           |
| <b>WG897870-1 MB</b>               |        |           |        |           |          |     |       |           |
| Acenaphthene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Acenaphthylene                     |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Anthracene                         |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Benz(a)anthracene                  |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Benzo(a)pyrene                     |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Benzo(b)fluoranthene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Benzo(g,h,i)perylene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Benzo(k)fluoranthene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Chrysene                           |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Dibenz(a,h)anthracene              |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Fluoranthene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Fluorene                           |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene            |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Naphthalene                        |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Phenanthrene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| Pyrene                             |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 26-JAN-09 |
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |        |           |        |           |          |     |       |           |
| <b>Batch R782229</b>               |        |           |        |           |          |     |       |           |
| <b>WG897870-3 DUP L685670-41</b>   |        |           |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1016                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1221                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1232                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1242                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1248                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1254                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1260                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1262                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| PCB-1268                           |        | <0.25     | <0.25  | RPD-NA    | mg/kg    | N/A | 39    | 26-JAN-09 |
| <b>PCB-T-WET-SOX-ECD-VA Tissue</b> |        |           |        |           |          |     |       |           |
| <b>Batch R782228</b>               |        |           |        |           |          |     |       |           |
| <b>WG897870-3 DUP L685670-41</b>   |        |           |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |        | <0.050    | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 26-JAN-09 |
| PCB-1016                           |        | <0.050    | <0.050 | RPD-NA    | mg/kg ww | N/A | 39    | 26-JAN-09 |

# ALS Laboratory Group Quality Control Report

Workorder: L685670

Report Date: 06-MAY-09

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| Test                               | Matrix         | Reference           | Result | Qualifier | Units    | RPD  | Limit  | Analyzed  |
|------------------------------------|----------------|---------------------|--------|-----------|----------|------|--------|-----------|
| <b>PCB-T-WET-SOX-ECD-VA Tissue</b> |                |                     |        |           |          |      |        |           |
| <b>Batch</b>                       | <b>R782228</b> |                     |        |           |          |      |        |           |
| <b>WG897870-3</b>                  | <b>DUP</b>     | <b>L685670-41</b>   |        |           |          |      |        |           |
| PCB-1221                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1232                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1242                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1248                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1254                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1260                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1262                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| PCB-1268                           |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A  | 39     | 26-JAN-09 |
| <b>WG897870-2</b>                  | <b>LCS</b>     |                     |        |           |          |      |        |           |
| PCB-1260                           |                |                     | 95     |           | %        |      | 50-150 | 26-JAN-09 |
| <b>WG897870-1</b>                  | <b>MB</b>      |                     |        |           |          |      |        |           |
| Total Polychlorinated Biphenyls    |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1016                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1221                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1232                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1242                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1248                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1254                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1260                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1262                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| PCB-1268                           |                |                     | <0.050 |           | mg/kg ww |      | 0.05   | 26-JAN-09 |
| <b>SE-DRY-HVAAS-VA Tissue</b>      |                |                     |        |           |          |      |        |           |
| <b>Batch</b>                       | <b>R778544</b> |                     |        |           |          |      |        |           |
| <b>WG895164-4</b>                  | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG895164-5</b>                  | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |          |      |        |           |
| <b>WG895164-1</b>                  | <b>MB</b>      |                     |        |           |          |      |        |           |
| Selenium (Se)-Total                |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 16-JAN-09 |
| <b>WG895164-2</b>                  | <b>MB</b>      |                     |        |           |          |      |        |           |
| Selenium (Se)-Total                |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 16-JAN-09 |
| <b>Batch</b>                       | <b>R778899</b> |                     |        |           |          |      |        |           |
| <b>WG895211-7</b>                  | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |          |      |        |           |
| <b>WG895211-8</b>                  | <b>DUP</b>     | <b>L685670-33</b>   |        |           |          |      |        |           |
| Selenium (Se)-Total                |                | 0.18                | 0.22   | J         | mg/kg    | 0.04 | 0.4    | 16-JAN-09 |
| <b>WG895211-5</b>                  | <b>MB</b>      |                     |        |           |          |      |        |           |
| Selenium (Se)-Total                |                |                     | <0.10  |           | mg/kg    |      | 0.1    | 16-JAN-09 |

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Workorder: L685670

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| Test                   | Matrix  | Reference    | Result | Qualifier | Units     | RPD   | Limit | Analyzed  |
|------------------------|---------|--------------|--------|-----------|-----------|-------|-------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |         |              |        |           |           |       |       |           |
| Tissue                 |         |              |        |           |           |       |       |           |
| Batch                  | R778899 |              |        |           |           |       |       |           |
| WG895211-6             | MB      |              |        |           |           |       |       |           |
| Selenium (Se)-Total    |         |              | <0.10  |           | mg/kg     |       | 0.1   | 16-JAN-09 |
| <b>SE-WET-HVAAS-VA</b> |         |              |        |           |           |       |       |           |
| Tissue                 |         |              |        |           |           |       |       |           |
| Batch                  | R778544 |              |        |           |           |       |       |           |
| WG895164-4             | CRM     | VA-NIST-1515 |        |           |           |       |       |           |
| WG895164-5             | CRM     | VA-NIST-1547 |        |           |           |       |       |           |
| WG895164-1             | MB      |              |        |           |           |       |       |           |
| Selenium (Se)-Total    |         |              | <0.020 |           | mg/kg wwt |       | 0.02  | 16-JAN-09 |
| WG895164-2             | MB      |              |        |           |           |       |       |           |
| Selenium (Se)-Total    |         |              | <0.020 |           | mg/kg wwt |       | 0.02  | 16-JAN-09 |
| Batch                  | R778899 |              |        |           |           |       |       |           |
| WG895211-7             | CRM     | VA-NIST-1515 |        |           |           |       |       |           |
| WG895211-8             | DUP     | L685670-33   |        |           |           |       |       |           |
| Selenium (Se)-Total    |         | 0.051        | 0.062  | J         | mg/kg wwt | 0.010 | 0.08  | 16-JAN-09 |
| WG895211-5             | MB      |              |        |           |           |       |       |           |
| Selenium (Se)-Total    |         |              | <0.020 |           | mg/kg wwt |       | 0.02  | 16-JAN-09 |
| WG895211-6             | MB      |              |        |           |           |       |       |           |
| Selenium (Se)-Total    |         |              | <0.020 |           | mg/kg wwt |       | 0.02  | 16-JAN-09 |



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Workorder: L685670

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### Legend:

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

### Sample Parameter Qualifier Definitions:

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| Qualifier | Description                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| DUP-H     | Duplicate results outside ALS DQO, due to sample heterogeneity.                                                                                      |
| G         | QC result did not meet ALS DQO. Refer to narrative comments for further information.                                                                 |
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                          |
| MB-LOR    | Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required. |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                          |

GENF14.00



|                                                                                                                                                   |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------|--|----------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| <b>REPORT TO:</b>                                                                                                                                 |                                                                              | <b>REPORT FORMAT / DISTRIBUTION</b>                |      | <b>SERVICE REQUESTED</b>                                                                                                                                                                                                                                                                  |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                              | STANDARD _____ OTHER _____                         |      | REGULAR SERVICE (DEFAULT)                                                                                                                                                                                                                                                                 |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                              | PDF _____ EXCEL _____ CUSTOM _____ FAX _____       |      | RUSH SERVICE (2-3 DAYS)                                                                                                                                                                                                                                                                   |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                              | EMAIL 1:                                           |      | PRIORITY SERVICE (1 DAY or ASAP)                                                                                                                                                                                                                                                          |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                              | EMAIL 2:                                           |      | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS                                                                                                                                                                                                                                        |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                              |                                                    |      | <b>ANALYSIS REQUEST</b>                                                                                                                                                                                                                                                                   |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                              | INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → → |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                              | CLIENT / PROJECT INFORMATION:                      |      | <div style="display: flex; justify-content: space-between;"> <div style="width: 100px; text-align: center;">HAZARDOUS ?</div> <div style="width: 100px; text-align: center;">HIGHLY CONTAMINATED ?</div> <div style="width: 100px; text-align: center;">NUMBER OF CONTAINERS</div> </div> |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                              | JOB #:                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                              | PO / AFE:                                          |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                              | Legal Site Description:                            |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                              | QUOTE #:                                           |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| Lab Work Order #<br>(lab use only)                                                                                                                |                                                                              |                                                    |      | SAMPLER<br>(Initials):                                                                                                                                                                                                                                                                    |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| Sample #                                                                                                                                          | <b>SAMPLE IDENTIFICATION</b><br>(This description will appear on the report) | DATE                                               | TIME | SAMPLE TYPE                                                                                                                                                                                                                                                                               |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 11                                                                                                                                                | Arroz # 2 soil "M"                                                           | Aug 27                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 12                                                                                                                                                | Arroz # 2 soil "M"                                                           | Aug 25                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 13                                                                                                                                                | Guineo # 1 soil "M"                                                          | Aug 27                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 14                                                                                                                                                | Guineo # 1 soil "M"                                                          | Aug 28                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 15                                                                                                                                                | Guineo # 1 soil "M"                                                          | Aug 29                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 16                                                                                                                                                | Guineo # 2 soil "M"                                                          | Aug 28                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 17                                                                                                                                                | Guineo # 2 soil "M"                                                          | Aug 29                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 18                                                                                                                                                | Yuka # 1 soil "M"                                                            | Aug 26                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 19                                                                                                                                                | Yuka # 1 Tuberculo "M"                                                       | Aug 29                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| 20                                                                                                                                                | Yuka # 1 soil "M"                                                            | Aug 29                                             |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| <b>GUIDE LINES / REGULATIONS</b>                                                                                                                  |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           | <b>SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS</b> |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| <h1>SAMPLES RECEIVED WITHOUT COC</h1>                                                                                                             |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy. |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  |                                                                      |  |  |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                              | DATE & TIME:                                       |      | RECEIVED BY:                                                                                                                                                                                                                                                                              |                                                 | DATE & TIME: |  | <b>SAMPLE CONDITION (lab use only)</b>                               |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                              |                                                    |      | HD 08/09/22                                                                                                                                                                                                                                                                               |                                                 | 08/10/22     |  | TEMPERATURE 12:10pm 18°C                                             |  |  |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                              | DATE & TIME:                                       |      | RECEIVED BY:                                                                                                                                                                                                                                                                              |                                                 | DATE & TIME: |  | SAMPLES RECEIVED IN GOOD CONDITION? YES / NO (If no provide details) |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                              |                                                    |      |                                                                                                                                                                                                                                                                                           |                                                 |              |  | YES / NO                                                             |  |  |  |  |  |  |  |  |  |

**Environmental Division**

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION



|                                                                                                                                                   |                                                                       |                                                         |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|------|----------------------------------------------------|--|--------------|--|--------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| REPORT TO:                                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                            |      | SERVICE REQUESTED                                  |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | STANDARD _____ OTHER _____                              |      | REGULAR SERVICE (DEFAULT)                          |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | PDF _____ EXCEL _____ CUSTOM _____ FAX _____            |      | RUSH SERVICE (2-3 DAYS)                            |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | EMAIL 1:                                                |      | PRIORITY SERVICE (1 DAY or ASAP)                   |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | EMAIL 2:                                                |      | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |                                                         |      | ANALYSIS REQUEST                                   |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P)      → → → |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                           |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | JOB #:                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                               |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | Legal Site Description:                                 |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       | QUOTE #:                                                |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| Lab Work Order #<br>(lab use only)                                                                                                                |                                                                       |                                                         |      | SAMPLER<br>(Initials):                             |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) | DATE                                                    | TIME | SAMPLE TYPE                                        |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 31                                                                                                                                                | Guineo # 1 leaves "M"                                                 | Aug 29                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 32                                                                                                                                                | Guineo # 1 leaves "M"                                                 | Aug 27                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 33                                                                                                                                                | Guineo # 1 leaves "M"                                                 | Aug 28                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 34                                                                                                                                                | Guineo # 2 leaves "M"                                                 | Aug 29                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 35                                                                                                                                                | Guineo # 2 leaves "M"                                                 | Aug 28                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 36                                                                                                                                                | Guineo # 2 leaves "M"                                                 | Aug 27                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 37                                                                                                                                                | Yuca # 1 leaves "M"                                                   | Aug 29                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 38                                                                                                                                                | Yuca # 1 leaves "M"                                                   | Aug 26                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 39                                                                                                                                                | Yuca # 2 leaves "M"                                                   | Aug 26                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| 40                                                                                                                                                | Yuca # 2 leaves "M"                                                   | Aug 29                                                  |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| GUIDE LINES / REGULATIONS                                                                                                                         |                                                                       |                                                         |      | SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS           |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| <b>SAMPLES RECEIVED WITHOUT COC</b>                                                                                                               |                                                                       |                                                         |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                       |                                                         |      |                                                    |  |              |  |                                                                                      |  |  |  |  |  |  |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |      | RECEIVED BY:                                       |  | DATE & TIME: |  | SAMPLE CONDITION (lab use only)                                                      |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       |                                                         |      | HD 08/09/22                                        |  | 12:10        |  | TEMPERATURE 19 SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details) |  |  |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |      | RECEIVED BY:                                       |  | DATE & TIME: |  |                                                                                      |  |  |  |  |  |  |  |  |  |

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|                                                                                                                                                          |                                                                              |                                                         |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------|------|----------------------------------------------------|--|--------------|--|----------------------------------------|--|--------------------------------------------------------------------------|--|--|--|--|--|--|--|
| <b>REPORT TO:</b>                                                                                                                                        |                                                                              | <b>REPORT FORMAT / DISTRIBUTION</b>                     |      | <b>SERVICE REQUESTED</b>                           |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| COMPANY: <u>Golder Assoc.</u>                                                                                                                            |                                                                              | STANDARD _____ OTHER _____                              |      | REGULAR SERVICE (DEFAULT)                          |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| CONTACT: <u>Susan Sose</u>                                                                                                                               |                                                                              | PDF _____ EXCEL _____ CUSTOM _____ FAX _____            |      | RUSH SERVICE (2-3 DAYS)                            |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                                 |                                                                              | EMAIL 1:                                                |      | PRIORITY SERVICE (1 DAY or ASAP)                   |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                          |                                                                              | EMAIL 2:                                                |      | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                                  |                                                                              |                                                         |      | <b>ANALYSIS REQUEST</b>                            |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                                    |                                                                              | INDICATE BOTTLES: FILTERED / PRESERVED (F/P)      → → → |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                                 |                                                                              | <b>CLIENT / PROJECT INFORMATION:</b>                    |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                                 |                                                                              | JOB #:                                                  |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                                 |                                                                              | PO / AFE:                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
|                                                                                                                                                          |                                                                              | Legal Site Description:                                 |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                                  |                                                                              | QUOTE #:                                                |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| Lab Work Order #<br>(lab use only)                                                                                                                       |                                                                              |                                                         |      | SAMPLER<br>(Initials):                             |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| Sample #                                                                                                                                                 | <b>SAMPLE IDENTIFICATION</b><br>(This description will appear on the report) | DATE                                                    | TIME | SAMPLE TYPE                                        |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 51                                                                                                                                                       | Guineo # 2 Fruto "0"                                                         | 29-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 52                                                                                                                                                       | " Soil "0"                                                                   | "                                                       |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 53                                                                                                                                                       | Fruto #1 Guineo "0"                                                          | 28-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 54                                                                                                                                                       | Fruto #2 Guineo "0"                                                          | "                                                       |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 55                                                                                                                                                       | Arroz #1 Leaves "0"                                                          | 27-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 56                                                                                                                                                       | " "                                                                          | 25-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 57                                                                                                                                                       | " Grano "0"                                                                  | 27-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 58                                                                                                                                                       | " "                                                                          | 25-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 59                                                                                                                                                       | " Soil "0"                                                                   | 25-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| 60                                                                                                                                                       | Arroz #2 Leaves "0"                                                          | 27-Aug-08                                               |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| <b>GUIDE INFO / REGULATIONS</b>                                                                                                                          |                                                                              |                                                         |      | <b>SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS</b>    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| <h1>SAMPLES RECEIVED WITHOUT COC</h1>                                                                                                                    |                                                                              |                                                         |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form <b>LEGIBLY</b> .                                              |                                                                              |                                                         |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| <b>By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.</b> |                                                                              |                                                         |      |                                                    |  |              |  |                                        |  |                                                                          |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                         |                                                                              | DATE & TIME:                                            |      | RECEIVED BY:                                       |  | DATE & TIME: |  | <b>SAMPLE CONDITION (lab use only)</b> |  |                                                                          |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                         |                                                                              | DATE & TIME:                                            |      | RECEIVED BY:                                       |  | DATE & TIME: |  | TEMPERATURE                            |  | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |  |  |  |  |  |  |  |

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|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|------|----------------------------------------------------|--|--------------|--|---------------------------------|--|--|--|--------------------------------------------------------------------------|--|--|--|--|--|
| REPORT TO:                                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                       |      | SERVICE REQUESTED                                  |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| COMPANY: <u>Golder Assoc.</u>                                                                                                                     |                                                                       | STANDARD _____ OTHER _____                         |      | REGULAR SERVICE (DEFAULT)                          |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| CONTACT: <u>Susan Sose</u>                                                                                                                        |                                                                       | PDF _____ EXCEL _____ CUSTOM _____ FAX _____       |      | RUSH SERVICE (2-3 DAYS)                            |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | EMAIL 1:                                           |      | PRIORITY SERVICE (1 DAY or ASAP)                   |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | EMAIL 2:                                           |      | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |                                                    |      | ANALYSIS REQUEST                                   |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → → |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                      |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | JOB #:                                             |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | Legal Site Description:                            |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       | QUOTE #:                                           |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| Lab Work Order #<br>(lab use only)                                                                                                                |                                                                       |                                                    |      | SAMPLER<br>(Initials):                             |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) | DATE                                               | TIME | SAMPLE TYPE                                        |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 61                                                                                                                                                | Arroz #2 Leaves "0"                                                   | 25-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 62                                                                                                                                                | " Soil "0"                                                            | "                                                  |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 63                                                                                                                                                | Guineo #1 Leaves "0"                                                  | 28-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 64                                                                                                                                                | " "                                                                   | 27-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 65                                                                                                                                                | " Fruit "0"                                                           | "                                                  |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 66                                                                                                                                                | " Soil "0"                                                            | 28-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 67                                                                                                                                                | Guineo #2 Leaves "0"                                                  | 27-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 68                                                                                                                                                | " "                                                                   | 28-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 69                                                                                                                                                | " Fruit "0"                                                           | 27-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| 70                                                                                                                                                | " Soil "0"                                                            | 28-Aug-08                                          |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| GUIDE LINES / REGULATIONS                                                                                                                         |                                                                       |                                                    |      | SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS           |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
| SAMPLES RECEIVED WITHOUT COC                                                                                                                      |                                                                       |                                                    |      |                                                    |  |              |  |                                 |  |  |  |                                                                          |  |  |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                       |      | RECEIVED BY:                                       |  | DATE & TIME: |  | SAMPLE CONDITION (lab use only) |  |  |  |                                                                          |  |  |  |  |  |
|                                                                                                                                                   |                                                                       |                                                    |      |                                                    |  |              |  | TEMPERATURE                     |  |  |  | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                       |      | RECEIVED BY:                                       |  | DATE & TIME: |  |                                 |  |  |  |                                                                          |  |  |  |  |  |



REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
**ATTN:** ADRIAN DE BRUYN  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

**Reported On:** 16-FEB-09 02:48 PM  
**Revision:** 1

**Lab Work Order #:** L693392

**Date Received:** 08-OCT-08

**Project P.O. #:**  
**Job Reference:**  
**Legal Site Desc:**  
**CofC Numbers:**  
**Other Information:**

**Comments:** Detection Limits for some Polycyclic Aromatic Hydrocarbons have been increased due to a combination of matrix interferences and low spike recoveries.

Amber Springer  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L693392-1    | L693392-2 | L693392-3 | L693392-4 | L693392-5 |
|-----------------------------------------------------------------------|-----------------------------------|--------------|-----------|-----------|-----------|-----------|
|                                                                       |                                   | GILL NET #13 | Fish #1   | Fish #2   | Fish #3   | Fish #4   |
| Grouping                                                              | Analyte                           |              |           |           |           |           |
| <b>TISSUE</b>                                                         |                                   |              |           |           |           |           |
| <b>Physical Tests</b>                                                 | % Moisture (%)                    | 71.8         | 73.4      | 75.3      | 69.8      | 72.4      |
| <b>Metals</b>                                                         | Aluminum (Al)-Total (mg/kg)       | 71           | 10        | 42        | 19        | 111       |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 20.1         | 2.7       | 10.5      | 5.7       | 30.6      |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050       | <0.050    | <0.050    | <0.050    | <0.10     |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010       | <0.010    | <0.010    | <0.010    | <0.020    |
|                                                                       | Arsenic (As)-Total (mg/kg)        | 5.14         | 1.26      | 3.79      | 9.69      | 3.79      |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | 1.45         | 0.335     | 0.935     | 2.93      | 1.05      |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 9.09         | 1.32      | 5.34      | 3.37      | 10.2      |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 2.56         | 0.351     | 1.32      | 1.02      | 2.82      |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30        | <0.30     | <0.30     | <0.30     | <0.60     |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10        | <0.10     | <0.10     | <0.10     | <0.20     |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30        | <0.30     | <0.30     | <0.30     | <0.60     |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030       | <0.030    | <0.030    | <0.030    | <0.060    |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.062        | 0.062     | <0.030    | 0.056     | <0.060    |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0175       | 0.0165    | 0.0061    | 0.0168    | 0.015     |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 42400        | 31000     | 43500     | 34600     | 66500     |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 12000        | 8250      | 10700     | 10400     | 18300     |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 1.06         | <0.50     | 0.51      | <0.50     | <1.0      |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.30         | <0.10     | 0.13      | <0.10     | <0.20     |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10        | <0.10     | <0.10     | <0.10     | <0.20     |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.026        | <0.020    | 0.022     | <0.020    | <0.040    |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 6.79         | 1.80      | 1.64      | 1.43      | 3.14      |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 1.92         | 0.479     | 0.403     | 0.432     | 0.865     |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 1.52         | <0.10     | 0.24      | <0.10     | <0.20     |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.429        | <0.020    | 0.060     | <0.020    | <0.040    |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50        | <0.50     | <0.50     | <0.50     | <1.0      |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10        | <0.10     | <0.10     | <0.10     | <0.20     |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1410         | 1300      | 1670      | 1260      | 1890      |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 398          | 347       | 411       | 380       | 523       |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 12.3         | 2.21      | 15.3      | 10.6      | 32.3      |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 3.47         | 0.589     | 3.78      | 3.22      | 8.91      |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.413        | 0.595     | 0.223     | 0.190     | 0.392     |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.117        | 0.158     | 0.0549    | 0.0574    | 0.108     |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.154        | <0.050    | <0.050    | <0.050    | <0.10     |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.044        | 0.010     | <0.010    | <0.010    | <0.020    |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 0.91         | <0.50     | <0.50     | <0.50     | <1.0      |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.26         | <0.10     | <0.10     | <0.10     | <0.20     |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 4.40         | 2.59      | 2.59      | 2.23      | 3.02      |
|                                                                       | Selenium (Se)-Total (mg/kg wwt)   | 1.24         | 0.690     | 0.640     | 0.672     | 0.834     |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 178          | 125       | 98.8      | 113       | 214       |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L693392-6 | L693392-7 | L693392-8   |  |  |
|-----------------------------------------------------------------------|-----------------------------------|-----------|-----------|-------------|--|--|
| Fish #5                                                               |                                   | Fish #5   | Fish #6   | UUPRO (UFI) |  |  |
| Grouping                                                              | Analyte                           |           |           |             |  |  |
| TISSUE                                                                |                                   |           |           |             |  |  |
| Physical Tests                                                        | % Moisture (%)                    | 63.6      | 67.6      | 75.3        |  |  |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | <20       | 35        | 31          |  |  |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 7.1       | 11.4      | 7.5         |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10     | <0.15     | <0.10       |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.020    | <0.030    | <0.020      |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg)        | 7.20      | 7.21      | 1.24        |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | 2.62      | 2.34      | 0.305       |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 5.98      | 9.03      | 48.1        |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 2.17      | 2.93      | 11.9        |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60     | <0.90     | <0.60       |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60     | <0.90     | <0.60       |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.060    | <0.090    | <0.060      |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.071     | <0.090    | 0.594       |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.026     | 0.027     | 0.147       |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 39700     | 75900     | 58600       |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 14400     | 24600     | 14500       |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | <1.0      | <1.5      | <1.0        |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.051     | <0.060    | <0.040      |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 1.48      | 1.64      | 2.53        |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 0.538     | 0.532     | 0.626       |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.040    | <0.060    | <0.040      |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0      | <1.5      | <1.0        |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1270      | 1940      | 1900        |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 463       | 629       | 468         |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 22.8      | 37.8      | 25.5        |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 8.27      | 12.3      | 6.29        |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.235     | 0.288     | 0.164       |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0854    | 0.0934    | 0.0405      |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.10     | <0.15     | 0.21        |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | <0.020    | <0.030    | 0.052       |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <1.0      | <1.5      | <1.0        |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | <0.20     | <0.30     | <0.20       |  |  |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 1.70      | 1.65      | 2.12        |  |  |
|                                                                       | Selenium (Se)-Total (mg/kg wwt)   | 0.618     | 0.536     | 0.524       |  |  |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 114       | 253       | 308         |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                    | L693392-1    | L693392-2 | L693392-3 | L693392-4 | L693392-5 |
|-----------------------------------------------------------------------|------------------------------------|--------------|-----------|-----------|-----------|-----------|
|                                                                       |                                    | GILL NET #13 | Fish #1   | Fish #2   | Fish #3   | Fish #4   |
| Grouping                                                              | Analyte                            |              |           |           |           |           |
| <b>TISSUE</b>                                                         |                                    |              |           |           |           |           |
| <b>Metals</b>                                                         | Strontium (Sr)-Total (mg/kg ww)    | 50.3         | 33.4      | 24.4      | 34.1      | 59.1      |
|                                                                       | Thallium (Tl)-Total (mg/kg)        | <0.030       | <0.030    | <0.030    | <0.030    | <0.060    |
|                                                                       | Thallium (Tl)-Total (mg/kg ww)     | <0.010       | <0.010    | <0.010    | <0.010    | <0.020    |
|                                                                       | Tin (Sn)-Total (mg/kg)             | <0.20        | 0.32      | <0.20     | <0.20     | <0.40     |
|                                                                       | Tin (Sn)-Total (mg/kg ww)          | <0.050       | 0.084     | <0.050    | <0.050    | <0.10     |
|                                                                       | Uranium (U)-Total (mg/kg)          | <0.010       | <0.010    | 0.021     | 0.018     | 0.041     |
|                                                                       | Uranium (U)-Total (mg/kg ww)       | 0.0024       | 0.0022    | 0.0051    | 0.0056    | 0.0113    |
|                                                                       | Vanadium (V)-Total (mg/kg)         | 0.98         | <0.50     | 0.82      | <0.50     | 1.2       |
|                                                                       | Vanadium (V)-Total (mg/kg ww)      | 0.28         | <0.10     | 0.20      | <0.10     | 0.32      |
|                                                                       | Zinc (Zn)-Total (mg/kg)            | 35.7         | 41.0      | 79.4      | 59.3      | 115       |
|                                                                       | Zinc (Zn)-Total (mg/kg ww)         | 10.1         | 10.9      | 19.6      | 17.9      | 31.6      |
|                                                                       |                                    |              |           |           |           |           |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)               | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       |                                    |              |           |           |           |           |
|                                                                       | Acenaphthene (mg/kg ww)            | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Acenaphthylene (mg/kg)             | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Acenaphthylene (mg/kg ww)          | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Anthracene (mg/kg)                 | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Anthracene (mg/kg ww)              | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Benz(a)anthracene (mg/kg)          | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Benz(a)anthracene (mg/kg ww)       | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Benzo(a)pyrene (mg/kg)             | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Benzo(a)pyrene (mg/kg ww)          | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Benzo(b)fluoranthene (mg/kg)       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Benzo(b)fluoranthene (mg/kg ww)    | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg ww)    | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Benzo(k)fluoranthene (mg/kg)       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Benzo(k)fluoranthene (mg/kg ww)    | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Chrysene (mg/kg)                   | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Chrysene (mg/kg ww)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)      | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg ww)   | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Fluoranthene (mg/kg)               | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Fluoranthene (mg/kg ww)            | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Fluorene (mg/kg)                   | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Fluorene (mg/kg ww)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg ww) | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Naphthalene (mg/kg)                | <0.050       | <0.050    | 0.102     | <0.050    | <0.050    |
|                                                                       | Naphthalene (mg/kg ww)             | <0.020       | <0.010    | 0.025     | <0.010    | <0.020    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                    | L693392-6 | L693392-7 | L693392-8   |  |  |
|-----------------------------------------------------------------------|------------------------------------|-----------|-----------|-------------|--|--|
|                                                                       |                                    | Fish #5   | Fish #6   | UUPRO (UFI) |  |  |
| Grouping                                                              | Analyte                            |           |           |             |  |  |
| <b>TISSUE</b>                                                         |                                    |           |           |             |  |  |
| <b>Metals</b>                                                         | Strontium (Sr)-Total (mg/kg ww)    | 41.5      | 82.1      | 76.1        |  |  |
|                                                                       | Thallium (Tl)-Total (mg/kg)        | <0.060    | <0.090    | <0.060      |  |  |
|                                                                       | Thallium (Tl)-Total (mg/kg ww)     | <0.020    | <0.030    | <0.020      |  |  |
|                                                                       | Tin (Sn)-Total (mg/kg)             | <0.40     | <0.60     | <0.40       |  |  |
|                                                                       | Tin (Sn)-Total (mg/kg ww)          | <0.10     | <0.15     | <0.10       |  |  |
|                                                                       | Uranium (U)-Total (mg/kg)          | <0.020    | 0.052     | <0.020      |  |  |
|                                                                       | Uranium (U)-Total (mg/kg ww)       | 0.0068    | 0.0170    | <0.0040     |  |  |
|                                                                       | Vanadium (V)-Total (mg/kg)         | <1.0      | <1.5      | <1.0        |  |  |
|                                                                       | Vanadium (V)-Total (mg/kg ww)      | 0.23      | <0.30     | 0.21        |  |  |
|                                                                       | Zinc (Zn)-Total (mg/kg)            | 81.1      | 115       | 162         |  |  |
|                                                                       | Zinc (Zn)-Total (mg/kg ww)         | 29.5      | 37.3      | 39.9        |  |  |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)               | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Acenaphthene (mg/kg ww)            | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Acenaphthylene (mg/kg)             | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Acenaphthylene (mg/kg ww)          | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Anthracene (mg/kg)                 | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Anthracene (mg/kg ww)              | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Benz(a)anthracene (mg/kg)          | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Benz(a)anthracene (mg/kg ww)       | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Benzo(a)pyrene (mg/kg)             | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Benzo(a)pyrene (mg/kg ww)          | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg)       | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg ww)    | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)       | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg ww)    | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg)       | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg ww)    | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Chrysene (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Chrysene (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)      | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg ww)   | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Fluoranthene (mg/kg)               | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Fluoranthene (mg/kg ww)            | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Fluorene (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Fluorene (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)    | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg ww) | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Naphthalene (mg/kg)                | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Naphthalene (mg/kg ww)             | <0.020    | 0.015     | <0.010      |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                            | L693392-1    | L693392-2 | L693392-3 | L693392-4 | L693392-5 |
|-----------------------------------------------------------------------|--------------------------------------------|--------------|-----------|-----------|-----------|-----------|
|                                                                       |                                            | GILL NET #13 | Fish #1   | Fish #2   | Fish #3   | Fish #4   |
| Grouping                                                              | Analyte                                    |              |           |           |           |           |
| <b>TISSUE</b>                                                         |                                            |              |           |           |           |           |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Phenanthrene (mg/kg)                       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Phenanthrene (mg/kg ww)                    | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Pyrene (mg/kg)                             | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Pyrene (mg/kg ww)                          | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)       | 63           | 62        | 79        | 59        | 64        |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)           | 61           | 70        | 85        | 64        | 66        |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)         | 49           | 46        | 61        | 42        | 52        |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)       | 64           | 65        | 80        | 61        | 64        |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1016 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1221 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1221 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1232 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1232 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1242 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1242 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1248 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1248 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1254 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1254 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1260 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1260 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1262 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1262 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | PCB-1268 (mg/kg)                           | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | PCB-1268 (mg/kg ww)                        | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)    | <0.25        | <0.25     | <1.3      | <0.25     | <1.3      |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg ww) | <0.050       | <0.050    | <0.25     | <0.050    | <0.25     |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                             | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Aldrin (mg/kg ww)                          | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | alpha-BHC (mg/kg)                          | <0.050       | <0.050    | <0.050    | <0.10     | <0.050    |
|                                                                       | alpha-BHC (mg/kg ww)                       | <0.010       | <0.010    | <0.010    | <0.020    | <0.010    |
|                                                                       | beta-BHC (mg/kg)                           | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | beta-BHC (mg/kg ww)                        | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Lindane (gamma - BHC) (mg/kg)              | <0.050       | <0.050    | <0.050    | <0.050    | <0.10     |
|                                                                       | Lindane (gamma - BHC) (mg/kg ww)           | <0.010       | <0.010    | <0.010    | <0.010    | <0.020    |
|                                                                       | delta-BHC (mg/kg)                          | <0.050       | <0.050    | <0.050    | <0.25     | <0.25     |
|                                                                       | delta-BHC (mg/kg ww)                       | <0.010       | <0.010    | <0.010    | <0.050    | <0.050    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                            | L693392-6 | L693392-7 | L693392-8   |  |  |
|-----------------------------------------------------------------------|--------------------------------------------|-----------|-----------|-------------|--|--|
|                                                                       |                                            | Fish #5   | Fish #6   | UUPRO (UFI) |  |  |
| Grouping                                                              | Analyte                                    |           |           |             |  |  |
| <b>TISSUE</b>                                                         |                                            |           |           |             |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Phenanthrene (mg/kg)                       | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Phenanthrene (mg/kg ww)                    | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Pyrene (mg/kg)                             | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Pyrene (mg/kg ww)                          | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)       | 47        | 67        | 72          |  |  |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)           | 49        | 66        | 78          |  |  |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)         | 35        | 51        | 52          |  |  |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)       | 48        | 68        | 77          |  |  |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1016 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1221 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1221 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1232 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1232 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1242 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1242 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1248 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1248 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1254 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1254 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1260 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1260 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1262 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1262 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | PCB-1268 (mg/kg)                           | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | PCB-1268 (mg/kg ww)                        | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)    | <0.25     | <0.25     | <0.25       |  |  |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg ww) | <0.050    | <0.050    | <0.050      |  |  |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                             | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Aldrin (mg/kg ww)                          | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | alpha-BHC (mg/kg)                          | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | alpha-BHC (mg/kg ww)                       | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | beta-BHC (mg/kg)                           | <0.050    | <0.10     | <0.050      |  |  |
|                                                                       | beta-BHC (mg/kg ww)                        | <0.010    | <0.020    | <0.010      |  |  |
|                                                                       | Lindane (gamma - BHC) (mg/kg)              | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Lindane (gamma - BHC) (mg/kg ww)           | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | delta-BHC (mg/kg)                          | <0.050    | <0.15     | <0.050      |  |  |
|                                                                       | delta-BHC (mg/kg ww)                       | <0.010    | <0.030    | <0.010      |  |  |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L693392-1    | L693392-2 | L693392-3 | L693392-4 | L693392-5 |
|-----------------------------------------------------------------------|-------------------------------------|--------------|-----------|-----------|-----------|-----------|
|                                                                       |                                     | GILL NET #13 | Fish #1   | Fish #2   | Fish #3   | Fish #4   |
| Grouping                                                              | Analyte                             |              |           |           |           |           |
| <b>TISSUE</b>                                                         |                                     |              |           |           |           |           |
| <b>Organochlorine<br/>Pesticides</b>                                  | cis-Chlordane (alpha) (mg/kg)       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 2,4'-DDD (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | 2,4'-DDD (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 4,4'-DDD (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | 4,4'-DDD (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 2,4'-DDE (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | 2,4'-DDE (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 4,4'-DDE (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | 4,4'-DDE (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 2,4'-DDT (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | 2,4'-DDT (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | 4,4'-DDT (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.10     |
|                                                                       | 4,4'-DDT (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.020    |
|                                                                       | Dieldrin (mg/kg)                    | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Dieldrin (mg/kg wwt)                | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Endosulfan I (mg/kg)                | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Endosulfan I (mg/kg wwt)            | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Endosulfan II (mg/kg)               | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Endosulfan II (mg/kg wwt)           | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Endosulfan Sulfate (mg/kg)          | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Endrin (mg/kg)                      | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Endrin (mg/kg wwt)                  | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Heptachlor (mg/kg)                  | <0.050       | <0.050    | <0.050    | <0.15     | <0.050    |
|                                                                       | Heptachlor (mg/kg wwt)              | <0.010       | <0.010    | <0.010    | <0.030    | <0.010    |
|                                                                       | Heptachlor Epoxide (mg/kg)          | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Methoxychlor (mg/kg)                | <0.050       | <0.050    | <0.050    | <0.050    | <0.10     |
|                                                                       | Methoxychlor (mg/kg wwt)            | <0.010       | <0.010    | <0.010    | <0.020    | <0.020    |
|                                                                       | Mirex (mg/kg)                       | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | Mirex (mg/kg wwt)                   | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | cis-Nonachlor (mg/kg)               | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | cis-Nonachlor (mg/kg wwt)           | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | trans-Nonachlor (mg/kg)             | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |
|                                                                       | trans-Nonachlor (mg/kg wwt)         | <0.010       | <0.010    | <0.010    | <0.010    | <0.010    |
|                                                                       | Oxychlordane (mg/kg)                | <0.050       | <0.050    | <0.050    | <0.050    | <0.050    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                    | L693392-6 | L693392-7 | L693392-8   |  |  |
|-----------------------------------------------------------------------|------------------------------------|-----------|-----------|-------------|--|--|
|                                                                       |                                    | Fish #5   | Fish #6   | UUPRO (UFI) |  |  |
| Grouping                                                              | Analyte                            |           |           |             |  |  |
| <b>TISSUE</b>                                                         |                                    |           |           |             |  |  |
| <b>Organochlorine<br/>Pesticides</b>                                  | cis-Chlordane (alpha) (mg/kg)      | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | cis-Chlordane (alpha) (mg/kg ww)   | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | trans-Chlordane (gamma) (mg/kg)    | <0.050    | <0.050    | <0.10       |  |  |
|                                                                       | trans-Chlordane (gamma) (mg/kg ww) | <0.010    | <0.010    | <0.020      |  |  |
|                                                                       | 2,4'-DDD (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 2,4'-DDD (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 4,4'-DDD (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 4,4'-DDD (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 2,4'-DDE (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 2,4'-DDE (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 4,4'-DDE (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 4,4'-DDE (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 2,4'-DDT (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 2,4'-DDT (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 4,4'-DDT (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | 4,4'-DDT (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | 4,4'-DDT (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Dieldrin (mg/kg)                   | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Dieldrin (mg/kg ww)                | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Endosulfan I (mg/kg)               | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Endosulfan I (mg/kg ww)            | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Endosulfan II (mg/kg)              | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Endosulfan II (mg/kg ww)           | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Endosulfan Sulfate (mg/kg)         | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Endosulfan Sulfate (mg/kg ww)      | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Endrin (mg/kg)                     | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Endrin (mg/kg ww)                  | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Heptachlor (mg/kg)                 | <0.10     | <0.050    | <0.050      |  |  |
|                                                                       | Heptachlor (mg/kg ww)              | <0.020    | <0.010    | <0.010      |  |  |
|                                                                       | Heptachlor Epoxide (mg/kg)         | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Heptachlor Epoxide (mg/kg ww)      | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Methoxychlor (mg/kg)               | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Methoxychlor (mg/kg ww)            | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Mirex (mg/kg)                      | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | Mirex (mg/kg ww)                   | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | cis-Nonachlor (mg/kg)              | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | cis-Nonachlor (mg/kg ww)           | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | trans-Nonachlor (mg/kg)            | <0.050    | <0.050    | <0.050      |  |  |
|                                                                       | trans-Nonachlor (mg/kg ww)         | <0.010    | <0.010    | <0.010      |  |  |
|                                                                       | Oxychlordane (mg/kg)               | <0.050    | <0.050    | <0.050      |  |  |

|                              |                         |                                                                       |                               |                          |                          |                          |                          |
|------------------------------|-------------------------|-----------------------------------------------------------------------|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                              |                         | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L693392-1<br><br>GILL NET #13 | L693392-2<br><br>Fish #1 | L693392-3<br><br>Fish #2 | L693392-4<br><br>Fish #3 | L693392-5<br><br>Fish #4 |
| Grouping                     | Analyte                 |                                                                       |                               |                          |                          |                          |                          |
| TISSUE                       |                         |                                                                       |                               |                          |                          |                          |                          |
| Organochlorine<br>Pesticides | Oxychlordane (mg/kg ww) |                                                                       | <0.010                        | <0.010                   | <0.010                   | <0.010                   | <0.010                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                                       |                         |                          |                          |                              |  |  |
|-----------------------------------------------------------------------|-------------------------|--------------------------|--------------------------|------------------------------|--|--|
| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                         | L693392-6<br><br>Fish #5 | L693392-7<br><br>Fish #6 | L693392-8<br><br>UUPRO (UFI) |  |  |
| Grouping                                                              | Analyte                 |                          |                          |                              |  |  |
| TISSUE                                                                |                         |                          |                          |                              |  |  |
| Organochlorine<br>Pesticides                                          | Oxychlordane (mg/kg ww) | <0.010                   | <0.010                   | <0.010                       |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-DRY-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MET-WET-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MOISTURE-TISS-VA** Tissue % Moisture in Tissues ASTM METHOD D2794-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

**OCP1-TDRY-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**OCP1-TWET-SOX-ECD-VA** Tissue OCP-1 in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, 8081 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).

**PAH-T-DRY-SOX-MS-VA** Tissue PAHs in Tissue by Soxhlet GCMS EPA METHODS 3540, 3600 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

**PAH-T-WET-SOX-MS-VA** Tissue PAHs in Tissue by Soxhlet GCMS EPA METHODS 3540, 3600 & 8270

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

**PCB-T-DRY-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**PCB-T-WET-SOX-ECD-VA** Tissue PCB in Tissue by Soxhlet GCECD EPA METHODS 3540, 3600, & 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**SE-DRY-HVAAS-VA** Tissue Selenium in Tissue by HVAAS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

**SE-WET-HVAAS-VA** Tissue Selenium in Tissue by HVAAS PUGET SOUND PROTOCOLS

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

**\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

### GLOSSARY OF REPORT TERMS

**Surr** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Environmental Division

# ALS Laboratory Group Quality Control Report

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Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: ADRIAN DE BRUYN

| Test                          | Matrix  | Reference    | Result  | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-------------------------------|---------|--------------|---------|-----------|----------|-----|--------|-----------|
| <b>HG-DRY-CVAFS-VA Tissue</b> |         |              |         |           |          |     |        |           |
| Batch                         | R762919 |              |         |           |          |     |        |           |
| WG878352-4                    | CRM     | VA-NRC-TORT2 |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | 90      |           | %        |     | 85-115 | 28-NOV-08 |
| WG878352-5                    | CRM     | VA-NIST-2976 |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | 87      |           | %        |     | 85-117 | 28-NOV-08 |
| WG878352-3                    | DUP     | L693392-3    |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         | 0.223        | 0.194   |           | mg/kg    | 14  | 45     | 28-NOV-08 |
| Batch                         | R763949 |              |         |           |          |     |        |           |
| WG878352-1                    | MB      |              |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | <0.0050 |           | mg/kg    |     | 0.005  | 02-DEC-08 |
| WG878352-2                    | MB      |              |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | <0.0050 |           | mg/kg    |     | 0.005  | 02-DEC-08 |
| <b>HG-WET-CVAFS-VA Tissue</b> |         |              |         |           |          |     |        |           |
| Batch                         | R762915 |              |         |           |          |     |        |           |
| WG878352-4                    | CRM     | VA-NRC-TORT2 |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | 90      |           | %        |     | 85-115 | 28-NOV-08 |
| WG878352-5                    | CRM     | VA-NIST-2976 |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | 87      |           | %        |     | 85-117 | 28-NOV-08 |
| WG878352-3                    | DUP     | L693392-3    |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         | 0.0549       | 0.0479  |           | mg/kg ww | 14  | 45     | 28-NOV-08 |
| Batch                         | R763949 |              |         |           |          |     |        |           |
| WG878352-1                    | MB      |              |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | <0.0010 |           | mg/kg ww |     | 0.001  | 02-DEC-08 |
| WG878352-2                    | MB      |              |         |           |          |     |        |           |
| Mercury (Hg)-Total            |         |              | <0.0010 |           | mg/kg ww |     | 0.001  | 02-DEC-08 |
| <b>MET-DRY-MS-VA Tissue</b>   |         |              |         |           |          |     |        |           |
| Batch                         | R762893 |              |         |           |          |     |        |           |
| WG878352-4                    | CRM     | VA-NRC-TORT2 |         |           |          |     |        |           |
| Arsenic (As)-Total            |         |              | 107     |           | %        |     | 83-108 | 28-NOV-08 |
| Cadmium (Cd)-Total            |         |              | 106     |           | %        |     | 91-122 | 28-NOV-08 |
| Copper (Cu)-Total             |         |              | 94      |           | %        |     | 80-108 | 28-NOV-08 |
| Lead (Pb)-Total               |         |              | 109     |           | %        |     | 67-141 | 28-NOV-08 |
| Manganese (Mn)-Total          |         |              | 96      |           | %        |     | 81-110 | 28-NOV-08 |
| Molybdenum (Mo)-Total         |         |              | 113     |           | %        |     | 87-115 | 28-NOV-08 |
| Nickel (Ni)-Total             |         |              | 93      |           | %        |     | 75-109 | 28-NOV-08 |
| Strontium (Sr)-Total          |         |              | 72      | RM-L      | %        |     | 77-111 | 28-NOV-08 |
| Vanadium (V)-Total            |         |              | 110     |           | %        |     | 90-125 | 28-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  | <b>Tissue</b>  |                     |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R762893</b> |                     |        |           |       |     |        |           |
| <b>WG878352-4 CRM</b> |                | <b>VA-NRC-TORT2</b> |        |           |       |     |        |           |
| Zinc (Zn)-Total       |                |                     | 102    |           | %     |     | 84-118 | 28-NOV-08 |
| <b>WG878352-5 CRM</b> |                | <b>VA-NIST-2976</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 84     |           | %     |     | 52-141 | 28-NOV-08 |
| Arsenic (As)-Total    |                |                     | 113    |           | %     |     | 83-137 | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 109    |           | %     |     | 76-124 | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 94     |           | %     |     | 53-137 | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                     | 104    |           | %     |     | 73-133 | 28-NOV-08 |
| Copper (Cu)-Total     |                |                     | 97     |           | %     |     | 80-119 | 28-NOV-08 |
| Lead (Pb)-Total       |                |                     | 103    |           | %     |     | 62-144 | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 79     |           | %     |     | 56-118 | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 82     |           | %     |     | 65-160 | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 104    |           | %     |     | 80-128 | 28-NOV-08 |
| <b>WG878352-1 MB</b>  |                |                     |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |     | 10     | 28-NOV-08 |
| Antimony (Sb)-Total   |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Arsenic (As)-Total    |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Barium (Ba)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Beryllium (Be)-Total  |                |                     | <0.30  |           | mg/kg |     | 0.3    | 28-NOV-08 |
| Bismuth (Bi)-Total    |                |                     | <0.30  |           | mg/kg |     | 0.3    | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | <0.030 |           | mg/kg |     | 0.03   | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                     | <10    |           | mg/kg |     | 10     | 28-NOV-08 |
| Chromium (Cr)-Total   |                |                     | <0.50  |           | mg/kg |     | 0.5    | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                     | <0.10  |           | mg/kg |     | 0.1    | 28-NOV-08 |
| Copper (Cu)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Lead (Pb)-Total       |                |                     | <0.10  |           | mg/kg |     | 0.1    | 28-NOV-08 |
| Lithium (Li)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | <3.0   |           | mg/kg |     | 3      | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg |     | 0.5    | 28-NOV-08 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 28-NOV-08 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg |     | 0.03   | 28-NOV-08 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg |     | 0.2    | 28-NOV-08 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg |     | 0.01   | 28-NOV-08 |



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| Test                  | Matrix         | Reference        | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|------------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>    |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R762893</b> |                  |        |           |       |     |       |           |
| <b>WG878352-1</b>     | <b>MB</b>      |                  |        |           |       |     |       |           |
| Vanadium (V)-Total    |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| <b>WG878352-2</b>     | <b>MB</b>      |                  |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |                  | <10    |           | mg/kg |     | 10    | 28-NOV-08 |
| Antimony (Sb)-Total   |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Arsenic (As)-Total    |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Barium (Ba)-Total     |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Beryllium (Be)-Total  |                |                  | <0.30  |           | mg/kg |     | 0.3   | 28-NOV-08 |
| Bismuth (Bi)-Total    |                |                  | <0.30  |           | mg/kg |     | 0.3   | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                  | <0.030 |           | mg/kg |     | 0.03  | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                  | <10    |           | mg/kg |     | 10    | 28-NOV-08 |
| Chromium (Cr)-Total   |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                  | <0.10  |           | mg/kg |     | 0.1   | 28-NOV-08 |
| Copper (Cu)-Total     |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Lead (Pb)-Total       |                |                  | <0.10  |           | mg/kg |     | 0.1   | 28-NOV-08 |
| Lithium (Li)-Total    |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                  | <3.0   |           | mg/kg |     | 3     | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Molybdenum (Mo)-Total |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Nickel (Ni)-Total     |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| Strontium (Sr)-Total  |                |                  | <0.050 |           | mg/kg |     | 0.05  | 28-NOV-08 |
| Thallium (Tl)-Total   |                |                  | <0.030 |           | mg/kg |     | 0.03  | 28-NOV-08 |
| Tin (Sn)-Total        |                |                  | <0.20  |           | mg/kg |     | 0.2   | 28-NOV-08 |
| Uranium (U)-Total     |                |                  | <0.010 |           | mg/kg |     | 0.01  | 28-NOV-08 |
| Vanadium (V)-Total    |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                  | <0.50  |           | mg/kg |     | 0.5   | 28-NOV-08 |
| <b>Batch</b>          | <b>R763809</b> |                  |        |           |       |     |       |           |
| <b>WG878352-3</b>     | <b>DUP</b>     | <b>L693392-3</b> |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                | 42               | 47     | J         | mg/kg | 5   | 40    | 29-NOV-08 |
| Antimony (Sb)-Total   |                | <0.050           | <0.050 | RPD-NA    | mg/kg | N/A | 45    | 29-NOV-08 |
| Arsenic (As)-Total    |                | 3.79             | 2.92   |           | mg/kg | 26  | 45    | 29-NOV-08 |
| Barium (Ba)-Total     |                | 5.34             | 5.66   |           | mg/kg | 5.9 | 45    | 29-NOV-08 |
| Beryllium (Be)-Total  |                | <0.30            | <0.30  | RPD-NA    | mg/kg | N/A | 45    | 29-NOV-08 |
| Bismuth (Bi)-Total    |                | <0.30            | <0.30  | RPD-NA    | mg/kg | N/A | 45    | 29-NOV-08 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD   | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |       |        |           |
| <b>Batch</b>          | <b>R763809</b> |                     |        |           |       |       |        |           |
| <b>WG878352-3</b>     | <b>DUP</b>     | <b>L693392-3</b>    |        |           |       |       |        |           |
| Cadmium (Cd)-Total    |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Calcium (Ca)-Total    |                | 43500               | 38900  |           | mg/kg | 11    | 45     | 29-NOV-08 |
| Chromium (Cr)-Total   |                | 0.51                | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Cobalt (Co)-Total     |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Copper (Cu)-Total     |                | 1.64                | 1.58   |           | mg/kg | 3.2   | 45     | 29-NOV-08 |
| Lithium (Li)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Magnesium (Mg)-Total  |                | 1670                | 1330   |           | mg/kg | 23    | 45     | 29-NOV-08 |
| Manganese (Mn)-Total  |                | 15.3                | 16.5   |           | mg/kg | 7.4   | 45     | 29-NOV-08 |
| Molybdenum (Mo)-Total |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Nickel (Ni)-Total     |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Strontium (Sr)-Total  |                | 98.8                | 82.1   |           | mg/kg | 18    | 45     | 29-NOV-08 |
| Thallium (Tl)-Total   |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Tin (Sn)-Total        |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A   | 45     | 29-NOV-08 |
| Uranium (U)-Total     |                | 0.021               | 0.018  | J         | mg/kg | 0.003 | 0.04   | 29-NOV-08 |
| Vanadium (V)-Total    |                | 0.82                | 0.85   | J         | mg/kg | 0.04  | 2      | 29-NOV-08 |
| Zinc (Zn)-Total       |                | 79.4                | 69.8   |           | mg/kg | 13    | 45     | 29-NOV-08 |
| <b>Batch</b>          | <b>R764460</b> |                     |        |           |       |       |        |           |
| <b>WG878352-3</b>     | <b>DUP</b>     | <b>L693392-3</b>    |        |           |       |       |        |           |
| Lead (Pb)-Total       |                | 0.24                | 0.51   | J         | mg/kg | 0.27  | 0.4    | 02-DEC-08 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |       |        |           |
| <b>Batch</b>          | <b>R762866</b> |                     |        |           |       |       |        |           |
| <b>WG878352-4</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |       |       |        |           |
| Arsenic (As)-Total    |                |                     | 107    |           | %     |       | 83-108 | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 106    |           | %     |       | 91-122 | 28-NOV-08 |
| Copper (Cu)-Total     |                |                     | 94     |           | %     |       | 80-108 | 28-NOV-08 |
| Lead (Pb)-Total       |                |                     | 109    |           | %     |       | 67-141 | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 96     |           | %     |       | 81-110 | 28-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | 113    |           | %     |       | 87-115 | 28-NOV-08 |
| Nickel (Ni)-Total     |                |                     | 93     |           | %     |       | 75-109 | 28-NOV-08 |
| Strontium (Sr)-Total  |                |                     | 72     | RM-L      | %     |       | 77-111 | 28-NOV-08 |
| Vanadium (V)-Total    |                |                     | 110    |           | %     |       | 90-125 | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 102    |           | %     |       | 84-118 | 28-NOV-08 |
| <b>WG878352-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |       |       |        |           |

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|----------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |          |     |        |           |
| <b>Batch</b>          | <b>R762866</b> |                     |         |           |          |     |        |           |
| <b>WG878352-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |         |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | 84      |           | %        |     | 52-141 | 28-NOV-08 |
| Arsenic (As)-Total    |                |                     | 113     |           | %        |     | 83-137 | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | 109     |           | %        |     | 76-124 | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                     | 94      |           | %        |     | 53-137 | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                     | 104     |           | %        |     | 73-133 | 28-NOV-08 |
| Copper (Cu)-Total     |                |                     | 97      |           | %        |     | 80-119 | 28-NOV-08 |
| Lead (Pb)-Total       |                |                     | 103     |           | %        |     | 62-144 | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | 79      |           | %        |     | 56-118 | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                     | 82      |           | %        |     | 65-160 | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                     | 104     |           | %        |     | 80-128 | 28-NOV-08 |
| <b>WG878352-1</b>     | <b>MB</b>      |                     |         |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0    |           | mg/kg ww |     | 2      | 28-NOV-08 |
| Antimony (Sb)-Total   |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Arsenic (As)-Total    |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Barium (Ba)-Total     |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Beryllium (Be)-Total  |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |
| Bismuth (Bi)-Total    |                |                     | <0.030  |           | mg/kg ww |     | 0.03   | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                     | <0.0050 |           | mg/kg ww |     | 0.005  | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                     | <2.0    |           | mg/kg ww |     | 2      | 28-NOV-08 |
| Chromium (Cr)-Total   |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                     | <0.020  |           | mg/kg ww |     | 0.02   | 28-NOV-08 |
| Copper (Cu)-Total     |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Lead (Pb)-Total       |                |                     | <0.020  |           | mg/kg ww |     | 0.02   | 28-NOV-08 |
| Lithium (Li)-Total    |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                     | <1.0    |           | mg/kg ww |     | 1      | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Molybdenum (Mo)-Total |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Nickel (Ni)-Total     |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |
| Strontium (Sr)-Total  |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Thallium (Tl)-Total   |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 28-NOV-08 |
| Tin (Sn)-Total        |                |                     | <0.050  |           | mg/kg ww |     | 0.05   | 28-NOV-08 |
| Uranium (U)-Total     |                |                     | <0.0020 |           | mg/kg ww |     | 0.002  | 28-NOV-08 |
| Vanadium (V)-Total    |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 28-NOV-08 |

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| Test                  | Matrix         | Reference        | Result  | Qualifier | Units    | RPD    | Limit | Analyzed  |
|-----------------------|----------------|------------------|---------|-----------|----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>    |         |           |          |        |       |           |
| <b>Batch</b>          | <b>R762866</b> |                  |         |           |          |        |       |           |
| <b>WG878352-2</b>     | <b>MB</b>      |                  |         |           |          |        |       |           |
| Aluminum (Al)-Total   |                |                  | <2.0    |           | mg/kg ww |        | 2     | 28-NOV-08 |
| Antimony (Sb)-Total   |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Arsenic (As)-Total    |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Barium (Ba)-Total     |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Beryllium (Be)-Total  |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| Bismuth (Bi)-Total    |                |                  | <0.030  |           | mg/kg ww |        | 0.03  | 28-NOV-08 |
| Cadmium (Cd)-Total    |                |                  | <0.0050 |           | mg/kg ww |        | 0.005 | 28-NOV-08 |
| Calcium (Ca)-Total    |                |                  | <2.0    |           | mg/kg ww |        | 2     | 28-NOV-08 |
| Chromium (Cr)-Total   |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| Cobalt (Co)-Total     |                |                  | <0.020  |           | mg/kg ww |        | 0.02  | 28-NOV-08 |
| Copper (Cu)-Total     |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Lead (Pb)-Total       |                |                  | <0.020  |           | mg/kg ww |        | 0.02  | 28-NOV-08 |
| Lithium (Li)-Total    |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| Magnesium (Mg)-Total  |                |                  | <1.0    |           | mg/kg ww |        | 1     | 28-NOV-08 |
| Manganese (Mn)-Total  |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Molybdenum (Mo)-Total |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Nickel (Ni)-Total     |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| Strontium (Sr)-Total  |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Thallium (Tl)-Total   |                |                  | <0.010  |           | mg/kg ww |        | 0.01  | 28-NOV-08 |
| Tin (Sn)-Total        |                |                  | <0.050  |           | mg/kg ww |        | 0.05  | 28-NOV-08 |
| Uranium (U)-Total     |                |                  | <0.0020 |           | mg/kg ww |        | 0.002 | 28-NOV-08 |
| Vanadium (V)-Total    |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| Zinc (Zn)-Total       |                |                  | <0.10   |           | mg/kg ww |        | 0.1   | 28-NOV-08 |
| <b>Batch</b>          | <b>R763747</b> |                  |         |           |          |        |       |           |
| <b>WG878352-3</b>     | <b>DUP</b>     | <b>L693392-3</b> |         |           |          |        |       |           |
| Aluminum (Al)-Total   |                | 10.5             | 11.6    | J         | mg/kg ww | 1.2    | 8     | 29-NOV-08 |
| Antimony (Sb)-Total   |                | <0.010           | <0.010  | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Arsenic (As)-Total    |                | 0.935            | 0.720   |           | mg/kg ww | 26     | 45    | 29-NOV-08 |
| Barium (Ba)-Total     |                | 1.32             | 1.40    |           | mg/kg ww | 5.9    | 45    | 29-NOV-08 |
| Beryllium (Be)-Total  |                | <0.10            | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Bismuth (Bi)-Total    |                | <0.030           | <0.030  | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Cadmium (Cd)-Total    |                | 0.0061           | 0.0053  | J         | mg/kg ww | 0.0008 | 0.02  | 29-NOV-08 |
| Calcium (Ca)-Total    |                | 10700            | 9600    |           | mg/kg ww | 11     | 45    | 29-NOV-08 |
| Chromium (Cr)-Total   |                | 0.13             | 0.10    | J         | mg/kg ww | 0.02   | 0.4   | 29-NOV-08 |

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| Test                        | Matrix         | Reference        | Result | Qualifier | Units    | RPD    | Limit | Analyzed  |
|-----------------------------|----------------|------------------|--------|-----------|----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>        |                | <b>Tissue</b>    |        |           |          |        |       |           |
| <b>Batch</b>                | <b>R763747</b> |                  |        |           |          |        |       |           |
| <b>WG878352-3</b>           | <b>DUP</b>     | <b>L693392-3</b> |        |           |          |        |       |           |
| Cobalt (Co)-Total           |                | 0.022            | <0.020 | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Copper (Cu)-Total           |                | 0.403            | 0.391  |           | mg/kg ww | 3.2    | 45    | 29-NOV-08 |
| Lithium (Li)-Total          |                | <0.10            | <0.10  | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Magnesium (Mg)-Total        |                | 411              | 327    |           | mg/kg ww | 23     | 45    | 29-NOV-08 |
| Manganese (Mn)-Total        |                | 3.78             | 4.07   |           | mg/kg ww | 7.4    | 45    | 29-NOV-08 |
| Molybdenum (Mo)-Total       |                | <0.010           | <0.010 | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Nickel (Ni)-Total           |                | <0.10            | <0.10  | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Strontium (Sr)-Total        |                | 24.4             | 20.3   |           | mg/kg ww | 18     | 45    | 29-NOV-08 |
| Thallium (Tl)-Total         |                | <0.010           | <0.010 | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Tin (Sn)-Total              |                | <0.050           | <0.050 | RPD-NA    | mg/kg ww | N/A    | 45    | 29-NOV-08 |
| Uranium (U)-Total           |                | 0.0051           | 0.0045 | J         | mg/kg ww | 0.0007 | 0.008 | 29-NOV-08 |
| Vanadium (V)-Total          |                | 0.20             | 0.21   | J         | mg/kg ww | 0.01   | 0.4   | 29-NOV-08 |
| Zinc (Zn)-Total             |                | 19.6             | 17.2   |           | mg/kg ww | 13     | 45    | 29-NOV-08 |
| <b>Batch</b>                | <b>R764437</b> |                  |        |           |          |        |       |           |
| <b>WG878352-3</b>           | <b>DUP</b>     | <b>L693392-3</b> |        |           |          |        |       |           |
| Lead (Pb)-Total             |                | 0.060            | 0.126  | J         | mg/kg ww | 0.066  | 0.08  | 02-DEC-08 |
| <b>MOISTURE-TISS-VA</b>     |                | <b>Tissue</b>    |        |           |          |        |       |           |
| <b>Batch</b>                | <b>R762148</b> |                  |        |           |          |        |       |           |
| <b>WG877749-1</b>           | <b>DUP</b>     | <b>L693392-3</b> |        |           |          |        |       |           |
| % Moisture                  |                | 75.3             | 74.4   |           | %        | 1.2    | 30    | 27-NOV-08 |
| <b>OCP1-TDRY-SOX-ECD-VA</b> |                | <b>Tissue</b>    |        |           |          |        |       |           |
| <b>Batch</b>                | <b>R774675</b> |                  |        |           |          |        |       |           |
| <b>WG885116-1</b>           | <b>MB</b>      |                  |        |           |          |        |       |           |
| alpha-BHC                   |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| Lindane (gamma - BHC)       |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| beta-BHC                    |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| delta-BHC                   |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| Heptachlor                  |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| Aldrin                      |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| Oxychlordane                |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| 2,4'-DDE                    |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |
| Heptachlor Epoxide          |                |                  | <0.050 |           | mg/kg    |        | 0.05  | 02-JAN-09 |

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| Test                        | Matrix  | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------------|---------|-----------|--------|-----------|-------|-----|-------|-----------|
| OCP1-TDRY-SOX-ECD-VA Tissue |         |           |        |           |       |     |       |           |
| Batch                       | R774675 |           |        |           |       |     |       |           |
| WG885116-1                  | MB      |           |        |           |       |     |       |           |
| trans-Chlordane (gamma)     |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| trans-Nonachlor             |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| cis-Chlordane (alpha)       |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 4,4'-DDE                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Endosulfan I                |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 2,4'-DDD                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Dieldrin                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 2,4'-DDT                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Endrin                      |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| cis-Nonachlor               |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 4,4'-DDD                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Endosulfan II               |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 4,4'-DDT                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Methoxychlor                |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Mirex                       |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Endosulfan Sulfate          |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| WG885961-1                  | MB      |           |        |           |       |     |       |           |
| alpha-BHC                   |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Lindane (gamma - BHC)       |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| beta-BHC                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| delta-BHC                   |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Heptachlor                  |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Aldrin                      |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Oxychlordane                |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 2,4'-DDE                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Heptachlor Epoxide          |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| trans-Chlordane (gamma)     |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| trans-Nonachlor             |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| cis-Chlordane (alpha)       |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 4,4'-DDE                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Endosulfan I                |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 2,4'-DDD                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| Dieldrin                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |
| 2,4'-DDT                    |         |           | <0.050 |           | mg/kg |     | 0.05  | 02-JAN-09 |

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| Test                               | Matrix         | Reference | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|------------------------------------|----------------|-----------|--------|-----------|-------|-----|--------|-----------|
| <b>OCP1-TDRY-SOX-ECD-VA Tissue</b> |                |           |        |           |       |     |        |           |
| <b>Batch</b>                       | <b>R774675</b> |           |        |           |       |     |        |           |
| <b>WG885961-1</b>                  | <b>MB</b>      |           |        |           |       |     |        |           |
| Endrin                             |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| cis-Nonachlor                      |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| 4,4'-DDD                           |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| Endosulfan II                      |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| 4,4'-DDT                           |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| Methoxychlor                       |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| Mirex                              |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| Endosulfan Sulfate                 |                |           | <0.050 |           | mg/kg |     | 0.05   | 02-JAN-09 |
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |           |        |           |       |     |        |           |
| <b>Batch</b>                       | <b>R774673</b> |           |        |           |       |     |        |           |
| <b>WG885116-2</b>                  | <b>LCS</b>     |           |        |           |       |     |        |           |
| alpha-BHC                          |                |           | 84     |           | %     |     | 50-150 | 02-JAN-09 |
| Lindane (gamma - BHC)              |                |           | 83     |           | %     |     | 50-150 | 02-JAN-09 |
| beta-BHC                           |                |           | 81     |           | %     |     | 50-150 | 02-JAN-09 |
| delta-BHC                          |                |           | 86     |           | %     |     | 50-150 | 02-JAN-09 |
| Heptachlor                         |                |           | 85     |           | %     |     | 50-150 | 02-JAN-09 |
| Aldrin                             |                |           | 87     |           | %     |     | 50-150 | 02-JAN-09 |
| Oxychlordane                       |                |           | 89     |           | %     |     | 50-150 | 02-JAN-09 |
| 2,4'-DDE                           |                |           | 118    |           | %     |     | 50-150 | 02-JAN-09 |
| Heptachlor Epoxide                 |                |           | 81     |           | %     |     | 50-150 | 02-JAN-09 |
| trans-Chlordane (gamma)            |                |           | 88     |           | %     |     | 50-150 | 02-JAN-09 |
| trans-Nonachlor                    |                |           | 89     |           | %     |     | 50-150 | 02-JAN-09 |
| cis-Chlordane (alpha)              |                |           | 90     |           | %     |     | 50-150 | 02-JAN-09 |
| 4,4'-DDE                           |                |           | 91     |           | %     |     | 50-150 | 02-JAN-09 |
| Endosulfan I                       |                |           | 85     |           | %     |     | 50-150 | 02-JAN-09 |
| 2,4'-DDD                           |                |           | 93     |           | %     |     | 50-150 | 02-JAN-09 |
| Dieldrin                           |                |           | 87     |           | %     |     | 50-150 | 02-JAN-09 |
| 2,4'-DDT                           |                |           | 90     |           | %     |     | 50-150 | 02-JAN-09 |
| Endrin                             |                |           | 86     |           | %     |     | 50-150 | 02-JAN-09 |
| cis-Nonachlor                      |                |           | 90     |           | %     |     | 50-150 | 02-JAN-09 |
| 4,4'-DDD                           |                |           | 95     |           | %     |     | 50-150 | 02-JAN-09 |
| Endosulfan II                      |                |           | 86     |           | %     |     | 50-150 | 02-JAN-09 |
| 4,4'-DDT                           |                |           | 87     |           | %     |     | 50-150 | 02-JAN-09 |
| Methoxychlor                       |                |           | 96     |           | %     |     | 50-150 | 02-JAN-09 |

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| Test                               | Matrix         | Reference | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|------------------------------------|----------------|-----------|--------|-----------|----------|-----|--------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |           |        |           |          |     |        |           |
| <b>Batch</b>                       | <b>R774673</b> |           |        |           |          |     |        |           |
| <b>WG885116-2</b>                  | <b>LCS</b>     |           |        |           |          |     |        |           |
| Methoxychlor                       |                |           | 96     |           | %        |     | 50-150 | 02-JAN-09 |
| Mirex                              |                |           | 90     |           | %        |     | 50-150 | 02-JAN-09 |
| Endosulfan Sulfate                 |                |           | 83     |           | %        |     | 50-150 | 02-JAN-09 |
| <b>WG885961-2</b>                  | <b>LCS</b>     |           |        |           |          |     |        |           |
| alpha-BHC                          |                |           | 83     |           | %        |     | 50-150 | 02-JAN-09 |
| Lindane (gamma - BHC)              |                |           | 84     |           | %        |     | 50-150 | 02-JAN-09 |
| beta-BHC                           |                |           | 84     |           | %        |     | 50-150 | 02-JAN-09 |
| delta-BHC                          |                |           | 88     |           | %        |     | 50-150 | 02-JAN-09 |
| Heptachlor                         |                |           | 85     |           | %        |     | 50-150 | 02-JAN-09 |
| Aldrin                             |                |           | 82     |           | %        |     | 50-150 | 02-JAN-09 |
| Oxychlordane                       |                |           | 89     |           | %        |     | 50-150 | 02-JAN-09 |
| 2,4'-DDE                           |                |           | 109    |           | %        |     | 50-150 | 02-JAN-09 |
| Heptachlor Epoxide                 |                |           | 85     |           | %        |     | 50-150 | 02-JAN-09 |
| trans-Chlordane (gamma)            |                |           | 88     |           | %        |     | 50-150 | 02-JAN-09 |
| trans-Nonachlor                    |                |           | 82     |           | %        |     | 50-150 | 02-JAN-09 |
| cis-Chlordane (alpha)              |                |           | 87     |           | %        |     | 50-150 | 02-JAN-09 |
| 4,4'-DDE                           |                |           | 89     |           | %        |     | 50-150 | 02-JAN-09 |
| Endosulfan I                       |                |           | 89     |           | %        |     | 50-150 | 02-JAN-09 |
| 2,4'-DDD                           |                |           | 91     |           | %        |     | 50-150 | 02-JAN-09 |
| Dieldrin                           |                |           | 93     |           | %        |     | 50-150 | 02-JAN-09 |
| 2,4'-DDT                           |                |           | 90     |           | %        |     | 50-150 | 02-JAN-09 |
| Endrin                             |                |           | 97     |           | %        |     | 50-150 | 02-JAN-09 |
| cis-Nonachlor                      |                |           | 90     |           | %        |     | 50-150 | 02-JAN-09 |
| 4,4'-DDD                           |                |           | 92     |           | %        |     | 50-150 | 02-JAN-09 |
| Endosulfan II                      |                |           | 51     |           | %        |     | 50-150 | 02-JAN-09 |
| 4,4'-DDT                           |                |           | 87     |           | %        |     | 50-150 | 02-JAN-09 |
| Methoxychlor                       |                |           | 93     |           | %        |     | 50-150 | 02-JAN-09 |
| Mirex                              |                |           | 87     |           | %        |     | 50-150 | 02-JAN-09 |
| Endosulfan Sulfate                 |                |           | 81     |           | %        |     | 50-150 | 02-JAN-09 |
| <b>WG885116-1</b>                  | <b>MB</b>      |           |        |           |          |     |        |           |
| alpha-BHC                          |                |           | <0.010 |           | mg/kg ww |     | 0.01   | 02-JAN-09 |
| Lindane (gamma - BHC)              |                |           | <0.010 |           | mg/kg ww |     | 0.01   | 02-JAN-09 |
| beta-BHC                           |                |           | <0.010 |           | mg/kg ww |     | 0.01   | 02-JAN-09 |
| delta-BHC                          |                |           | <0.010 |           | mg/kg ww |     | 0.01   | 02-JAN-09 |



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| Test                               | Matrix         | Reference | Result | Qualifier | Units     | RPD | Limit | Analyzed  |
|------------------------------------|----------------|-----------|--------|-----------|-----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |           |        |           |           |     |       |           |
| <b>Batch</b>                       | <b>R774673</b> |           |        |           |           |     |       |           |
| <b>WG885116-1</b>                  | <b>MB</b>      |           |        |           |           |     |       |           |
| Heptachlor                         |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Aldrin                             |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Oxychlordane                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 2,4'-DDE                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Heptachlor Epoxide                 |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| trans-Chlordane (gamma)            |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| trans-Nonachlor                    |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| cis-Chlordane (alpha)              |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 4,4'-DDE                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Endosulfan I                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 2,4'-DDD                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Dieldrin                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 2,4'-DDT                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Endrin                             |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| cis-Nonachlor                      |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 4,4'-DDD                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Endosulfan II                      |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 4,4'-DDT                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Methoxychlor                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Mirex                              |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Endosulfan Sulfate                 |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| <b>WG885961-1</b>                  | <b>MB</b>      |           |        |           |           |     |       |           |
| alpha-BHC                          |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Lindane (gamma - BHC)              |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| beta-BHC                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| delta-BHC                          |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Heptachlor                         |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Aldrin                             |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Oxychlordane                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| 2,4'-DDE                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| Heptachlor Epoxide                 |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| trans-Chlordane (gamma)            |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| trans-Nonachlor                    |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |
| cis-Chlordane (alpha)              |                |           | <0.010 |           | mg/kg wwt |     | 0.01  | 02-JAN-09 |

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| Test                               | Matrix         | Reference        | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|----------------|------------------|--------|-----------|----------|-----|-------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |                  |        |           |          |     |       |           |
| Batch                              | <b>R774673</b> |                  |        |           |          |     |       |           |
| <b>WG885961-1</b>                  | <b>MB</b>      |                  |        |           |          |     |       |           |
| 4,4'-DDE                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Endosulfan I                       |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| 2,4'-DDD                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Dieldrin                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| 2,4'-DDT                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Endrin                             |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| cis-Nonachlor                      |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| 4,4'-DDD                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Endosulfan II                      |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| 4,4'-DDT                           |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Methoxychlor                       |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Mirex                              |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| Endosulfan Sulfate                 |                |                  | <0.010 |           | mg/kg ww |     | 0.01  | 02-JAN-09 |
| <b>PAH-T-DRY-SOX-MS-VA Tissue</b>  |                |                  |        |           |          |     |       |           |
| Batch                              | <b>R774330</b> |                  |        |           |          |     |       |           |
| <b>WG885116-3</b>                  | <b>DUP</b>     | <b>L693392-6</b> |        |           |          |     |       |           |
| Acenaphthene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Acenaphthylene                     |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Anthracene                         |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Benz(a)anthracene                  |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Benzo(a)pyrene                     |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Benzo(b)fluoranthene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Benzo(g,h,i)perylene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Benzo(k)fluoranthene               |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Chrysene                           |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Dibenz(a,h)anthracene              |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Fluoranthene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Fluorene                           |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Indeno(1,2,3-c,d)pyrene            |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Naphthalene                        |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Phenanthrene                       |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| Pyrene                             |                | <0.050           | <0.050 | RPD-NA    | mg/kg    | N/A | 39    | 31-DEC-08 |
| <b>WG885116-1</b>                  | <b>MB</b>      |                  |        |           |          |     |       |           |
| Acenaphthene                       |                |                  | <0.050 |           | mg/kg    |     | 0.05  | 31-DEC-08 |

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| Test                    | Matrix  | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-------------------------|---------|-----------|--------|-----------|-------|-----|-------|-----------|
| PAH-T-DRY-SOX-MS-VA     | Tissue  |           |        |           |       |     |       |           |
| Batch                   | R774330 |           |        |           |       |     |       |           |
| WG885116-1              | MB      |           |        |           |       |     |       |           |
| Acenaphthylene          |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Anthracene              |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benz(a)anthracene       |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(a)pyrene          |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(b)fluoranthene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(g,h,i)perylene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(k)fluoranthene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Chrysene                |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Dibenz(a,h)anthracene   |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Fluoranthene            |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Fluorene                |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Naphthalene             |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Phenanthrene            |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Pyrene                  |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| WG885961-1              | MB      |           |        |           |       |     |       |           |
| Acenaphthene            |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Acenaphthylene          |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Anthracene              |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benz(a)anthracene       |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(a)pyrene          |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(b)fluoranthene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(g,h,i)perylene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Benzo(k)fluoranthene    |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Chrysene                |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Dibenz(a,h)anthracene   |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Fluoranthene            |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Fluorene                |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Naphthalene             |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Phenanthrene            |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| Pyrene                  |         |           | <0.050 |           | mg/kg |     | 0.05  | 31-DEC-08 |
| PAH-T-WET-SOX-MS-VA     | Tissue  |           |        |           |       |     |       |           |

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| Test                    | Matrix  | Reference | Result | Qualifier | Units      | RPD | Limit  | Analyzed  |
|-------------------------|---------|-----------|--------|-----------|------------|-----|--------|-----------|
| PAH-T-WET-SOX-MS-VA     |         | Tissue    |        |           |            |     |        |           |
| Batch                   | R773914 |           |        |           |            |     |        |           |
| WG885116-3              | DUP     | L693392-6 |        |           |            |     |        |           |
| Acenaphthene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Acenaphthylene          |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Anthracene              |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Benz(a)anthracene       |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Benzo(a)pyrene          |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Benzo(b)fluoranthene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Benzo(g,h,i)perylene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Benzo(k)fluoranthene    |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Chrysene                |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Dibenz(a,h)anthracene   |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Fluoranthene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Fluorene                |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Naphthalene             |         | <0.020    | 0.014  | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Phenanthrene            |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| Pyrene                  |         | <0.010    | <0.010 | RPD-NA    | mg/kg wwft | N/A | 39     | 30-DEC-08 |
| WG885116-2              | LCS     |           |        |           |            |     |        |           |
| Acenaphthene            |         |           | 52     | G         | %          |     | 55-145 | 30-DEC-08 |
| Acenaphthylene          |         |           | 49     | G         | %          |     | 55-145 | 30-DEC-08 |
| Anthracene              |         |           | 69     |           | %          |     | 55-145 | 30-DEC-08 |
| Benz(a)anthracene       |         |           | 71     |           | %          |     | 55-145 | 30-DEC-08 |
| Benzo(a)pyrene          |         |           | 76     |           | %          |     | 55-145 | 30-DEC-08 |
| Benzo(b)fluoranthene    |         |           | 85     |           | %          |     | 55-145 | 30-DEC-08 |
| Benzo(g,h,i)perylene    |         |           | 89     |           | %          |     | 55-145 | 30-DEC-08 |
| Benzo(k)fluoranthene    |         |           | 83     |           | %          |     | 55-145 | 30-DEC-08 |
| Chrysene                |         |           | 73     |           | %          |     | 55-145 | 30-DEC-08 |
| Dibenz(a,h)anthracene   |         |           | 82     |           | %          |     | 55-145 | 30-DEC-08 |
| Fluoranthene            |         |           | 81     |           | %          |     | 55-145 | 30-DEC-08 |
| Fluorene                |         |           | 58     |           | %          |     | 55-145 | 30-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | 82     |           | %          |     | 55-145 | 30-DEC-08 |
| Naphthalene             |         |           | 35     | G         | %          |     | 55-145 | 30-DEC-08 |
| Phenanthrene            |         |           | 72     |           | %          |     | 55-145 | 30-DEC-08 |
| Pyrene                  |         |           | 81     |           | %          |     | 55-145 | 30-DEC-08 |
| WG885961-2              | LCS     |           |        |           |            |     |        |           |

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| Test                    | Matrix  | Reference | Result | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-------------------------|---------|-----------|--------|-----------|----------|-----|--------|-----------|
| PAH-T-WET-SOX-MS-VA     |         | Tissue    |        |           |          |     |        |           |
| Batch                   | R773914 |           |        |           |          |     |        |           |
| WG885961-2              | LCS     |           |        |           |          |     |        |           |
| Acenaphthene            |         |           | 66     |           | %        |     | 55-145 | 30-DEC-08 |
| Acenaphthylene          |         |           | 63     |           | %        |     | 55-145 | 30-DEC-08 |
| Anthracene              |         |           | 87     |           | %        |     | 55-145 | 30-DEC-08 |
| Benz(a)anthracene       |         |           | 103    |           | %        |     | 55-145 | 30-DEC-08 |
| Benzo(a)pyrene          |         |           | 100    |           | %        |     | 55-145 | 30-DEC-08 |
| Benzo(b)fluoranthene    |         |           | 110    |           | %        |     | 55-145 | 30-DEC-08 |
| Benzo(g,h,i)perylene    |         |           | 93     |           | %        |     | 55-145 | 30-DEC-08 |
| Benzo(k)fluoranthene    |         |           | 100    |           | %        |     | 55-145 | 30-DEC-08 |
| Chrysene                |         |           | 100    |           | %        |     | 55-145 | 30-DEC-08 |
| Dibenz(a,h)anthracene   |         |           | 100    |           | %        |     | 55-145 | 30-DEC-08 |
| Fluoranthene            |         |           | 98     |           | %        |     | 55-145 | 30-DEC-08 |
| Fluorene                |         |           | 75     |           | %        |     | 55-145 | 30-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | 99     |           | %        |     | 55-145 | 30-DEC-08 |
| Naphthalene             |         |           | 48     | LCS-L     | %        |     | 55-145 | 30-DEC-08 |
| Phenanthrene            |         |           | 90     |           | %        |     | 55-145 | 30-DEC-08 |
| Pyrene                  |         |           | 98     |           | %        |     | 55-145 | 30-DEC-08 |
| WG885116-1              | MB      |           |        |           |          |     |        |           |
| Acenaphthene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Acenaphthylene          |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Anthracene              |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Benz(a)anthracene       |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Benzo(a)pyrene          |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Benzo(b)fluoranthene    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Benzo(g,h,i)perylene    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Benzo(k)fluoranthene    |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Chrysene                |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Dibenz(a,h)anthracene   |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Fluoranthene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Fluorene                |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Indeno(1,2,3-c,d)pyrene |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Naphthalene             |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Phenanthrene            |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| Pyrene                  |         |           | <0.010 |           | mg/kg ww |     | 0.01   | 30-DEC-08 |
| WG885961-1              | MB      |           |        |           |          |     |        |           |

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| Test                               | Matrix | Reference | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------------------|--------|-----------|--------|-----------|----------|-----|-------|-----------|
| <b>PAH-T-WET-SOX-MS-VA Tissue</b>  |        |           |        |           |          |     |       |           |
| <b>Batch R773914</b>               |        |           |        |           |          |     |       |           |
| <b>WG885961-1 MB</b>               |        |           |        |           |          |     |       |           |
| Acenaphthene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Acenaphthylene                     |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Anthracene                         |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Benz(a)anthracene                  |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Benzo(a)pyrene                     |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Benzo(b)fluoranthene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Benzo(g,h,i)perylene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Benzo(k)fluoranthene               |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Chrysene                           |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Dibenz(a,h)anthracene              |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Fluoranthene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Fluorene                           |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Indeno(1,2,3-c,d)pyrene            |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Naphthalene                        |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Phenanthrene                       |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| Pyrene                             |        |           | <0.010 |           | mg/kg ww |     | 0.01  | 30-DEC-08 |
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |        |           |        |           |          |     |       |           |
| <b>Batch R774675</b>               |        |           |        |           |          |     |       |           |
| <b>WG885116-1 MB</b>               |        |           |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1016                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1221                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1232                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1242                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1248                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1254                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1260                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1262                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1268                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| <b>WG885961-1 MB</b>               |        |           |        |           |          |     |       |           |
| Total Polychlorinated Biphenyls    |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1016                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1221                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |
| PCB-1232                           |        |           | <0.25  |           | mg/kg    |     | 0.25  | 02-JAN-09 |

# ALS Laboratory Group Quality Control Report

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| Test                               | Matrix  | Reference | Result | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------------------|---------|-----------|--------|-----------|-----------|-----|--------|-----------|
| <b>PCB-T-DRY-SOX-ECD-VA Tissue</b> |         |           |        |           |           |     |        |           |
| Batch                              | R774675 |           |        |           |           |     |        |           |
| <b>WG885961-1 MB</b>               |         |           |        |           |           |     |        |           |
| PCB-1242                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| PCB-1248                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| PCB-1254                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| PCB-1260                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| PCB-1262                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| PCB-1268                           |         |           | <0.25  |           | mg/kg     |     | 0.25   | 02-JAN-09 |
| <b>PCB-T-WET-SOX-ECD-VA Tissue</b> |         |           |        |           |           |     |        |           |
| Batch                              | R774673 |           |        |           |           |     |        |           |
| <b>WG885116-2 LCS</b>              |         |           |        |           |           |     |        |           |
| PCB-1260                           |         |           | 86     |           | %         |     | 50-150 | 02-JAN-09 |
| <b>WG885961-2 LCS</b>              |         |           |        |           |           |     |        |           |
| PCB-1260                           |         |           | 84     |           | %         |     | 50-150 | 02-JAN-09 |
| <b>WG885116-1 MB</b>               |         |           |        |           |           |     |        |           |
| Total Polychlorinated Biphenyls    |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1016                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1221                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1232                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1242                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1248                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1254                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1260                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1262                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1268                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| <b>WG885961-1 MB</b>               |         |           |        |           |           |     |        |           |
| Total Polychlorinated Biphenyls    |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1016                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1221                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1232                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1242                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1248                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1254                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1260                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1262                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |
| PCB-1268                           |         |           | <0.050 |           | mg/kg wwt |     | 0.05   | 02-JAN-09 |

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| Test                   | Matrix         | Reference        | Result | Qualifier | Units    | RPD | Limit | Analyzed  |
|------------------------|----------------|------------------|--------|-----------|----------|-----|-------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |                |                  |        |           |          |     |       |           |
| Tissue                 |                |                  |        |           |          |     |       |           |
| <b>Batch</b>           | <b>R764130</b> |                  |        |           |          |     |       |           |
| <b>WG878352-3</b>      | <b>DUP</b>     | <b>L693392-3</b> |        |           |          |     |       |           |
| Selenium (Se)-Total    |                | 2.59             | 2.75   |           | mg/kg    | 5.9 | 45    | 02-DEC-08 |
| <b>WG878352-1</b>      | <b>MB</b>      |                  |        |           |          |     |       |           |
| Selenium (Se)-Total    |                |                  | <0.10  |           | mg/kg    |     | 0.1   | 02-DEC-08 |
| <b>WG878352-2</b>      | <b>MB</b>      |                  |        |           |          |     |       |           |
| Selenium (Se)-Total    |                |                  | <0.10  |           | mg/kg    |     | 0.1   | 02-DEC-08 |
| <b>SE-WET-HVAAS-VA</b> |                |                  |        |           |          |     |       |           |
| Tissue                 |                |                  |        |           |          |     |       |           |
| <b>Batch</b>           | <b>R764132</b> |                  |        |           |          |     |       |           |
| <b>WG878352-3</b>      | <b>DUP</b>     | <b>L693392-3</b> |        |           |          |     |       |           |
| Selenium (Se)-Total    |                | 0.640            | 0.678  |           | mg/kg ww | 5.9 | 45    | 02-DEC-08 |
| <b>WG878352-1</b>      | <b>MB</b>      |                  |        |           |          |     |       |           |
| Selenium (Se)-Total    |                |                  | <0.020 |           | mg/kg ww |     | 0.02  | 02-DEC-08 |
| <b>WG878352-2</b>      | <b>MB</b>      |                  |        |           |          |     |       |           |
| Selenium (Se)-Total    |                |                  | <0.020 |           | mg/kg ww |     | 0.02  | 02-DEC-08 |



## ALS Laboratory Group Quality Control Report

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### Legend:

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

### Sample Parameter Qualifier Definitions:

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| Qualifier | Description                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| G         | QC result did not meet ALS DQO. Refer to narrative comments for further information.                                                                                                                                 |
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                                                                                          |
| LCS-L     | Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RM-L      | Reference Material recovery was below ALS DQO. Lab Control Sample and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                                                                                          |

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD

ATTN: MEL ZWIERINK

102 - 2535 3 AVE SE

CALGARY AB T2A 7W5

Reported On: 29-DEC-08 05:57 PM

Lab Work Order #: **L716654**

Date Received: **10-DEC-08**

Project P.O. #: PANAMA

Job Reference: 07-1334-0298

Legal Site Desc:

CofC Numbers: 1(METALS)

Other Information:

Comments:

GLENYSS WEEKS  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample Details/Parameters                                                                                                               |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|-----------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-1 PTM 001-01 (0-5CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach  |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                      |  | 5.10   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                            |  | 0.0766 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                           |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                     |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                           |  | 37900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                           |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                            |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                             |  | 32.6   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                          |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                            |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                            |  | 1.45   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                            |  | 57     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                           |  | 2.3    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                             |  | 7.4    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                             |  | 54.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                               |  | 56500  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                               |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                            |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                          |  | 421    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                          |  | 184    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                         |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                          |  | 213    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                           |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                           |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                             |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                             |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                          |  | 3.50   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                           |  | 620    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                            |  | 224    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                               |  | 5.7    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-2 PTM 002-02 (5-30CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                      |  | 4.95   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                            |  | 0.0913 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                           |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                     |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                           |  | 40100  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                           |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                            |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                             |  | 33.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                          |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                            |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                            |  | 4.20   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                            |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample Details/Parameters                                                                                                                         |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-2 PTM 002-02 (5-30CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Chromium (Cr)                                                                                                                                     |  | 134    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                       |  | 14.1   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                       |  | 125    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                         |  | 121000 |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                         |  | 87     |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                      |  | 4.2    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                    |  | 309    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                    |  | 603    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                   |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                       |  | 12.6   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                    |  | 304    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                     |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                                     |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                       |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                    |  | 2.27   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                          |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                     |  | 95.7   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                      |  | 301    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                         |  | 163    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-3 PTM 001-02 (5-30CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach           |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                                |  | 5.00   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                                      |  | 0.0507 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                                     |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                               |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                                     |  | 55200  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                                     |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                                      |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                                       |  | 57.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                                    |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                                      |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                                      |  | 1.47   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                                      |  | 59     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                                     |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                       |  | 8.0    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                       |  | 84.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                         |  | 53200  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                         |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                      |  | 2.8    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                    |  | 616    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                    |  | 244    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                   |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                       |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                    |  | 217    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                     |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |

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| Sample Details/Parameters                                                                                                                        |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-3PTM 001-02 (5-30CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Selenium (Se)                                                                                                                                    |  | 2.3    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                      |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                      |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                   |  | 5.25   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                         |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                    |  | 785    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                     |  | 195    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                        |  | 7.8    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-4PTM 001-03 (30-60CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach          |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                               |  | 4.69   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                                     |  | 0.0267 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                                    |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                              |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                                    |  | 40400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                                    |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                                     |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                                      |  | 103    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                                   |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                                     |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                                     |  | 1.14   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                                     |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                                    |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                      |  | 13.6   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                      |  | 89.9   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                        |  | 45400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                        |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                     |  | 2.7    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                   |  | 920    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                   |  | 790    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                  |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                      |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                   |  | 181    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                    |  | 380    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                                    |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                      |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                      |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                   |  | 5.82   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                         |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                    |  | 850    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                     |  | 160    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                        |  | 9.2    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-5PTM 001-04 (60-90CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:                                                                      |  |        |            |        |       |           |           |     |         |

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| Sample Details/Parameters                                                                                                                |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-5 PTM 001-04 (60-90CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.58   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.116  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 39900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 75.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | 1.13   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                            |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                              |  | 11.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                              |  | 93.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                |  | 47400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                             |  | 2.7    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                           |  | 829    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                           |  | 651    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                          |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                              |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                           |  | 172    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                            |  | 320    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                            |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                              |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                           |  | 3.86   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                 |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                            |  | 677    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                             |  | 168    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                |  | 8.1    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-6 PTM 002-01 (0-5CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach   |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.87   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.104  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 34400  |            | 100    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Antimony (Sb)                                                                                                                            |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Arsenic (As)                                                                                                                             |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Barium (Ba)                                                                                                                              |  | 38.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Beryllium (Be)                                                                                                                           |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Bismuth (Bi)                                                                                                                             |  | <40    |            | 40     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Cadmium (Cd)                                                                                                                             |  | 4.4    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Calcium (Ca)                                                                                                                             |  | <100   |            | 100    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |

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| Sample Details/Parameters                                                                                                                        |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-6 PTM 002-01 (0-5CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Chromium (Cr)                                                                                                                                    |  | 173    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Cobalt (Co)                                                                                                                                      |  | 29.5   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Copper (Cu)                                                                                                                                      |  | 132    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Iron (Fe)                                                                                                                                        |  | 134000 |            | 100    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Lead (Pb)                                                                                                                                        |  | 132    |            | 60     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Lithium (Li)                                                                                                                                     |  | 5.9    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Magnesium (Mg)                                                                                                                                   |  | 230    |            | 100    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Manganese (Mn)                                                                                                                                   |  | 993    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Molybdenum (Mo)                                                                                                                                  |  | <8.0   |            | 8.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Nickel (Ni)                                                                                                                                      |  | 11     |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Phosphorus (P)                                                                                                                                   |  | 470    |            | 100    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Potassium (K)                                                                                                                                    |  | <400   |            | 400    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Selenium (Se)                                                                                                                                    |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Silver (Ag)                                                                                                                                      |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Sodium (Na)                                                                                                                                      |  | <400   |            | 400    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Strontium (Sr)                                                                                                                                   |  | 1.9    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Tin (Sn)                                                                                                                                         |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Titanium (Ti)                                                                                                                                    |  | 117    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Vanadium (V)                                                                                                                                     |  | 303    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| Zinc (Zn)                                                                                                                                        |  | 200    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773575 |
| L716654-7 PTM 002-03 (30-60CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach         |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                               |  | 4.93   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                                     |  | 0.0591 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                                    |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                              |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                                    |  | 41100  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                                    |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                                     |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                                      |  | 187    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                                   |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                                     |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                                     |  | 3.82   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                                     |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                                    |  | 170    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                      |  | 38.5   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                      |  | 186    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                        |  | 108000 |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                        |  | 199    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                     |  | 6.8    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                   |  | 251    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                   |  | 1810   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                  |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                      |  | 20.4   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                   |  | 233    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                    |  | 300    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |



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| Sample Details/Parameters                                                                                                                         |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-7PTM 002-03 (30-60CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Selenium (Se)                                                                                                                                     |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                       |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                    |  | 2.39   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                          |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                     |  | 76.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                      |  | 297    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                         |  | 167    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-8PTM 002-04 (60-90CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach           |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                                |  | 5.02   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                                      |  | 0.0367 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                                     |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                               |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                                     |  | 41100  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                                     |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                                      |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                                       |  | 185    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                                    |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                                      |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                                      |  | 4.89   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                                      |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                                     |  | 329    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                       |  | 36.1   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                       |  | 260    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                         |  | 134000 |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                         |  | 243    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                      |  | 3.3    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                    |  | 151    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                    |  | 1610   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                   |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                       |  | 39.9   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                    |  | 258    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                     |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                                     |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                       |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                    |  | 3.20   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                          |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                     |  | 198    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                      |  | 393    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                         |  | 234    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-9PTM 003-01 (0-5CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:                                                                         |  |        |            |        |       |           |           |     |         |

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| Sample Details/Parameters                                                                                                                |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-9 PTM 003-01 (0-5CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach   |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.96   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.0758 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 18200  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 10.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                            |  | 5.6    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                              |  | 16.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                |  | 27800  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                             |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                           |  | 289    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                           |  | 101    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                          |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                              |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                           |  | 63     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                            |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                            |  | 2.9    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                              |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                           |  | 1.57   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                 |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                            |  | 121    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                             |  | 117    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                |  | 13.7   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-10 PTM 003-02 (5-30CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.90   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.0705 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 19500  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 10.8   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |

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| Sample Details/Parameters           |                      | Result | Qualifier* | D.L.  | Units     | Extracted | Analyzed | By      | Batch |
|-------------------------------------|----------------------|--------|------------|-------|-----------|-----------|----------|---------|-------|
| L716654-10                          | PTM 003-02 (5-30CM)  |        |            |       |           |           |          |         |       |
| Sampled By: CLIENT on 12-OCT-08     |                      |        |            |       |           |           |          |         |       |
| Matrix:                             |                      |        |            |       |           |           |          |         |       |
| Metals in Soil (CCME) + ICP         |                      |        |            |       |           |           |          |         |       |
| Metals in Soil by ICPOES (CSR SALM) |                      |        |            |       |           |           |          |         |       |
| Chromium (Cr)                       | 4.6                  |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Cobalt (Co)                         | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Copper (Cu)                         | 17.8                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Iron (Fe)                           | 26800                |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Lead (Pb)                           | <30                  |        | 30         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Lithium (Li)                        | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Magnesium (Mg)                      | 290                  |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Manganese (Mn)                      | 97.8                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Molybdenum (Mo)                     | <4.0                 |        | 4.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Nickel (Ni)                         | <5.0                 |        | 5.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Phosphorus (P)                      | 53                   |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Potassium (K)                       | <200                 |        | 200        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Selenium (Se)                       | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Silver (Ag)                         | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Sodium (Na)                         | <200                 |        | 200        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Strontium (Sr)                      | 1.37                 |        | 0.50       | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Tin (Sn)                            | <5.0                 |        | 5.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Titanium (Ti)                       | 102                  |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Vanadium (V)                        | 131                  |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Zinc (Zn)                           | 14.2                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| L716654-11                          | PTM 003-03 (30-60CM) |        |            |       |           |           |          |         |       |
| Sampled By: CLIENT on 12-OCT-08     |                      |        |            |       |           |           |          |         |       |
| Matrix:                             |                      |        |            |       |           |           |          |         |       |
| Metals in Soil (CCME) + ICP         |                      |        |            |       |           |           |          |         |       |
| CSR pH by 1:2 Water Leach           |                      |        |            |       |           |           |          |         |       |
| pH                                  | 4.57                 |        | 0.01       | pH    |           | 24-DEC-08 | BBB      | R773084 |       |
| Mercury (Hg)                        | 0.0349               |        | 0.0050     | mg/kg | 23-DEC-08 | 29-DEC-08 | CY       | R773331 |       |
| Thallium (Tl)                       | <1.0                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS      | R773573 |       |
| Metals in Soil by ICPOES (CSR SALM) |                      |        |            |       |           |           |          |         |       |
| Aluminum (Al)                       | 28700                |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Antimony (Sb)                       | <10                  |        | 10         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Arsenic (As)                        | <5.0                 |        | 5.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Barium (Ba)                         | 10.0                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Beryllium (Be)                      | <0.50                |        | 0.50       | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Bismuth (Bi)                        | <20                  |        | 20         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Cadmium (Cd)                        | 1.61                 |        | 0.50       | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Calcium (Ca)                        | <50                  |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Chromium (Cr)                       | 2.2                  |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Cobalt (Co)                         | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Copper (Cu)                         | 43.6                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Iron (Fe)                           | 58500                |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Lead (Pb)                           | <30                  |        | 30         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Lithium (Li)                        | <2.0                 |        | 2.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Magnesium (Mg)                      | 331                  |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Manganese (Mn)                      | 91.5                 |        | 1.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Molybdenum (Mo)                     | <4.0                 |        | 4.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Nickel (Ni)                         | <5.0                 |        | 5.0        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Phosphorus (P)                      | 69                   |        | 50         | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |
| Potassium (K)                       | <200                 |        | 200        | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R      | R773544 |       |

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| Sample Details/Parameters                                                                                                                           |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-11 PTM 003-03 (30-60CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Selenium (Se)                                                                                                                                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                         |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                         |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                      |  | 0.90   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                            |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                       |  | 139    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                        |  | 183    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                           |  | 16.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-12 PTM 003-04 (60-90CM)<br>Sampled By: CLIENT on 12-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach           |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                                  |  | 4.70   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                                        |  | 0.0161 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                                       |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                                 |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                                       |  | 41400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                                       |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                                        |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                                         |  | 9.8    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                                      |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                                        |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                                        |  | 1.37   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                                        |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                                         |  | 2.7    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                                         |  | 54.1   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                           |  | 52700  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                           |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                                        |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                                      |  | 291    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                                      |  | 108    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                                     |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                                         |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                                      |  | 97     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                                       |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                                       |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                                         |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                                         |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                                      |  | 0.75   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                            |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                                       |  | 254    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                                        |  | 191    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                           |  | 17.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-13 PTM 004-01 (0-5CM)<br>Sampled By: CLIENT on 13-OCT-08<br>Matrix:                                                                         |  |        |            |        |       |           |           |     |         |

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| Sample Details/Parameters                                                                                                                |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-13 PTM 004-01 (0-5CM)<br>Sampled By: CLIENT on 13-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach  |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.69   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.153  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 38000  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 31.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | 3.14   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | 58     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                            |  | 21.8   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                              |  | 21.9   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                              |  | 198    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                |  | 95300  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                             |  | 9.8    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                           |  | 513    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                           |  | 1470   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                          |  | 4.2    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                              |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                           |  | 545    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                            |  | 270    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                            |  | <3.0   |            | 3.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                              |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                           |  | 2.00   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                 |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                            |  | 180    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                             |  | 318    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                |  | 52.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-14 PTM 004-02 (5-30CM)<br>Sampled By: CLIENT on 13-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.78   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.0915 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 40400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 32.8   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | 3.22   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |

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| Sample Details/Parameters           |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|-------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-14PTM 004-02 (5-30CM)       |  |        |            |        |       |           |           |     |         |
| Sampled By: CLIENT on 13-OCT-08     |  |        |            |        |       |           |           |     |         |
| Matrix:                             |  |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP         |  |        |            |        |       |           |           |     |         |
| Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Chromium (Cr)                       |  | 22.3   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                         |  | 32.2   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                         |  | 243    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                           |  | 98500  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                           |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                        |  | 12.3   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                      |  | 512    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                      |  | 2200   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                     |  | 4.6    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                         |  | 5.3    |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                      |  | 548    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                       |  | 400    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                       |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                         |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                         |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                      |  | 1.78   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                            |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                       |  | 173    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                        |  | 316    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                           |  | 62.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-15PTM 004-03 (30-60CM)      |  |        |            |        |       |           |           |     |         |
| Sampled By: CLIENT on 13-OCT-08     |  |        |            |        |       |           |           |     |         |
| Matrix:                             |  |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP         |  |        |            |        |       |           |           |     |         |
| CSR pH by 1:2 Water Leach           |  |        |            |        |       |           |           |     |         |
| pH                                  |  | 4.90   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                        |  | 0.115  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                       |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM) |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                       |  | 44300  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                       |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                        |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                         |  | 18.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                      |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                        |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                        |  | 3.08   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                        |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                       |  | 22.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                         |  | 39.2   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                         |  | 202    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                           |  | 96900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                           |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                        |  | 10.5   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                      |  | 623    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                      |  | 2120   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                     |  | 4.7    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                         |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                      |  | 359    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                       |  | 270    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |

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| Sample Details/Parameters                  |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|--------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-15     PTM 004-03 (30-60CM)        |  |        |            |        |       |           |           |     |         |
| Sampled By:    CLIENT on 13-OCT-08         |  |        |            |        |       |           |           |     |         |
| Matrix:                                    |  |        |            |        |       |           |           |     |         |
| <b>Metals in Soil (CCME) + ICP</b>         |  |        |            |        |       |           |           |     |         |
| <b>Metals in Soil by ICPOES (CSR SALM)</b> |  |        |            |        |       |           |           |     |         |
| Selenium (Se)                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                             |  | 1.36   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                   |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                              |  | 217    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                               |  | 310    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                  |  | 48.7   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-16     PTM 004-04 (60-90CM)        |  |        |            |        |       |           |           |     |         |
| Sampled By:    CLIENT on 13-OCT-08         |  |        |            |        |       |           |           |     |         |
| Matrix:                                    |  |        |            |        |       |           |           |     |         |
| <b>Metals in Soil (CCME) + ICP</b>         |  |        |            |        |       |           |           |     |         |
| <b>CSR pH by 1:2 Water Leach</b>           |  |        |            |        |       |           |           |     |         |
| pH                                         |  | 4.92   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                               |  | 0.0982 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                              |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| <b>Metals in Soil by ICPOES (CSR SALM)</b> |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                              |  | 42700  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                              |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                               |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                |  | 19.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                             |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                               |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                               |  | 3.24   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                               |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                              |  | 19.6   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                |  | 32.8   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                |  | 211    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                  |  | 100000 |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                  |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                               |  | 10.6   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                             |  | 602    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                             |  | 1910   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                            |  | 4.2    |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                             |  | 359    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                              |  | 250    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                              |  | 2.3    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                             |  | 1.21   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                   |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                              |  | 170    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                               |  | 324    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                  |  | 50.8   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-17     PTM 005-01 (0-5CM)          |  |        |            |        |       |           |           |     |         |
| Sampled By:    CLIENT on 13-OCT-08         |  |        |            |        |       |           |           |     |         |
| Matrix:                                    |  |        |            |        |       |           |           |     |         |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample Details/Parameters                                                                                                                |  | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|------------------------------------------------------------------------------------------------------------------------------------------|--|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-17 PTM 005-01 (0-5CM)<br>Sampled By: CLIENT on 13-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach  |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.85   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.189  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 45900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 16.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | 3.24   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | 85     |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                                                                                            |  | 86.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                                                                              |  | 65.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                                                                              |  | 156    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                                                                                |  | 99500  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                                                                                |  | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                                                                                             |  | 7.1    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                                                                                           |  | 326    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                                                                                           |  | 1970   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                                                                                          |  | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                                                                              |  | 7.6    |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                                                                                           |  | 470    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                                                                                            |  | 220    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                                                                                            |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                                                                              |  | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                                                                              |  | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                                                                                           |  | 2.45   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                                                                                 |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                                                                                            |  | 291    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                                                                                             |  | 373    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                                                                                |  | 35.9   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-18 PTM 005-02 (5-30CM)<br>Sampled By: CLIENT on 13-OCT-08<br>Matrix:<br>Metals in Soil (CCME) + ICP<br>CSR pH by 1:2 Water Leach |  |        |            |        |       |           |           |     |         |
| pH                                                                                                                                       |  | 4.80   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                                                                                             |  | 0.126  |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                                                                                            |  | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                                                                                      |  |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                                                                                            |  | 41400  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                                                                                            |  | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                                                                                             |  | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                                                                              |  | 20.3   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                                                                                           |  | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                                                                                             |  | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                                                                                             |  | 3.18   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                                                                                             |  | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |



| Sample Details/Parameters           |                      | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|-------------------------------------|----------------------|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-18                          | PTM 005-02 (5-30CM)  |        |            |        |       |           |           |     |         |
| Sampled By:                         | CLIENT on 13-OCT-08  |        |            |        |       |           |           |     |         |
| Matrix:                             |                      |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP         |                      |        |            |        |       |           |           |     |         |
| Metals in Soil by ICPOES (CSR SALM) |                      |        |            |        |       |           |           |     |         |
|                                     | Chromium (Cr)        | 98.1   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Cobalt (Co)          | 51.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Copper (Cu)          | 204    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Iron (Fe)            | 98900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Lead (Pb)            | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Lithium (Li)         | 8.1    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Magnesium (Mg)       | 367    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Manganese (Mn)       | 1950   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Molybdenum (Mo)      | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Nickel (Ni)          | 8.7    |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Phosphorus (P)       | 373    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Potassium (K)        | 210    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Selenium (Se)        | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Silver (Ag)          | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Sodium (Na)          | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Strontium (Sr)       | 1.60   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Tin (Sn)             | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Titanium (Ti)        | 289    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Vanadium (V)         | 358    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Zinc (Zn)            | 40.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-19                          | PTM 005-03 (30-60CM) |        |            |        |       |           |           |     |         |
| Sampled By:                         | CLIENT on 13-OCT-08  |        |            |        |       |           |           |     |         |
| Matrix:                             |                      |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP         |                      |        |            |        |       |           |           |     |         |
| CSR pH by 1:2 Water Leach           |                      |        |            |        |       |           |           |     |         |
|                                     | pH                   | 4.75   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
|                                     | Mercury (Hg)         | 0.0664 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
|                                     | Thallium (Tl)        | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM) |                      |        |            |        |       |           |           |     |         |
|                                     | Aluminum (Al)        | 41600  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Antimony (Sb)        | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Arsenic (As)         | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Barium (Ba)          | 33.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Beryllium (Be)       | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Bismuth (Bi)         | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Cadmium (Cd)         | 3.23   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Calcium (Ca)         | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Chromium (Cr)        | 92.3   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Cobalt (Co)          | 43.1   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Copper (Cu)          | 258    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Iron (Fe)            | 99900  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Lead (Pb)            | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Lithium (Li)         | 9.9    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Magnesium (Mg)       | 484    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Manganese (Mn)       | 1930   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
|                                     | Molybdenum (Mo)      | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 |           |     |         |

| Sample Details/Parameters                                                  |                      | Result | Qualifier* | D.L.   | Units | Extracted | Analyzed  | By  | Batch   |
|----------------------------------------------------------------------------|----------------------|--------|------------|--------|-------|-----------|-----------|-----|---------|
| L716654-19                                                                 | PTM 005-03 (30-60CM) |        |            |        |       |           |           |     |         |
| Sampled By: CLIENT on 13-OCT-08                                            |                      |        |            |        |       |           |           |     |         |
| Matrix:                                                                    |                      |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP                                                |                      |        |            |        |       |           |           |     |         |
| Metals in Soil by ICPOES (CSR SALM)                                        |                      |        |            |        |       |           |           |     |         |
| Selenium (Se)                                                              |                      | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                |                      | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                |                      | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                             |                      | 1.85   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                   |                      | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                              |                      | 400    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                               |                      | 365    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                  |                      | 47.7   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| L716654-20                                                                 | PTM 005-04 (60-90CM) |        |            |        |       |           |           |     |         |
| Sampled By: CLIENT on 13-OCT-08                                            |                      |        |            |        |       |           |           |     |         |
| Matrix:                                                                    |                      |        |            |        |       |           |           |     |         |
| Metals in Soil (CCME) + ICP                                                |                      |        |            |        |       |           |           |     |         |
| CSR pH by 1:2 Water Leach                                                  |                      |        |            |        |       |           |           |     |         |
| pH                                                                         |                      | 4.87   |            | 0.01   | pH    |           | 24-DEC-08 | BBB | R773084 |
| Mercury (Hg)                                                               |                      | 0.0657 |            | 0.0050 | mg/kg | 23-DEC-08 | 29-DEC-08 | CY  | R773331 |
| Thallium (Tl)                                                              |                      | <1.0   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | AQS | R773573 |
| Metals in Soil by ICPOES (CSR SALM)                                        |                      |        |            |        |       |           |           |     |         |
| Aluminum (Al)                                                              |                      | 43300  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Antimony (Sb)                                                              |                      | <10    |            | 10     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Arsenic (As)                                                               |                      | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Barium (Ba)                                                                |                      | 36.4   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Beryllium (Be)                                                             |                      | <0.50  |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Bismuth (Bi)                                                               |                      | <20    |            | 20     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cadmium (Cd)                                                               |                      | 3.13   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Calcium (Ca)                                                               |                      | <50    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Chromium (Cr)                                                              |                      | 75.4   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Cobalt (Co)                                                                |                      | 57.9   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Copper (Cu)                                                                |                      | 301    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Iron (Fe)                                                                  |                      | 96200  |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lead (Pb)                                                                  |                      | <30    |            | 30     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Lithium (Li)                                                               |                      | 14.7   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Magnesium (Mg)                                                             |                      | 525    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Manganese (Mn)                                                             |                      | 2460   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Molybdenum (Mo)                                                            |                      | <4.0   |            | 4.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Nickel (Ni)                                                                |                      | 14.6   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Phosphorus (P)                                                             |                      | 333    |            | 50     | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Potassium (K)                                                              |                      | 230    |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Selenium (Se)                                                              |                      | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Silver (Ag)                                                                |                      | <2.0   |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Sodium (Na)                                                                |                      | <200   |            | 200    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Strontium (Sr)                                                             |                      | 1.64   |            | 0.50   | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Tin (Sn)                                                                   |                      | <5.0   |            | 5.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Titanium (Ti)                                                              |                      | 417    |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Vanadium (V)                                                               |                      | 356    |            | 2.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| Zinc (Zn)                                                                  |                      | 55.2   |            | 1.0    | mg/kg | 23-DEC-08 | 29-DEC-08 | A.R | R773544 |
| * Refer to Referenced Information for Qualifiers (if any) and Methodology. |                      |        |            |        |       |           |           |     |         |

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code    | Matrix | Test Description        | Preparation Method Reference(Based On) | Analytical Method Reference(Based On) |
|------------------|--------|-------------------------|----------------------------------------|---------------------------------------|
| HG-CCME-CVAFS-VA | Soil   | CVAFS Hg in Soil (CCME) |                                        | CCME                                  |

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

|                     |      |                                     |                          |
|---------------------|------|-------------------------------------|--------------------------|
| MET-CSR-FULL-ICP-VA | Soil | Metals in Soil by ICPOES (CSR SALM) | BCMELP CSR SALM METHOD 8 |
|---------------------|------|-------------------------------------|--------------------------|

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

|           |      |                           |                                         |
|-----------|------|---------------------------|-----------------------------------------|
| PH-1:2-VA | Soil | CSR pH by 1:2 Water Leach | BC WLAP METHOD: PH, ELECTROMETRIC, SOIL |
|-----------|------|---------------------------|-----------------------------------------|

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

|              |      |                              |                          |
|--------------|------|------------------------------|--------------------------|
| TL-CSR-MS-VA | Soil | ICPMS TI in Soil by CSR SALM | BCMELP CSR SALM Method 8 |
|--------------|------|------------------------------|--------------------------|

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

1(METALS)

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million.

mg/L (units) - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

*Test results reported relate only to the samples as received by the laboratory.*

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

*Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.*

*ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.*



**Environmental Division**

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Client: GOLDER ASSOCIATES LTD  
102 - 2535 3 AVE SE  
CALGARY AB T2A 7W5

Contact: MEL ZWIERINK

| Test                       | Matrix         | Reference              | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|---------|-----------|-------|-----|--------|-----------|
| <b>HG-CCME-CVAFS-VA</b>    |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R773331</b> |                        |         |           |       |     |        |           |
| <b>WG889415-10</b>         | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 108     |           | %     |     | 85-116 | 29-DEC-08 |
| <b>WG889415-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 113     |           | %     |     | 86-139 | 29-DEC-08 |
| <b>WG889415-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 103     |           | %     |     | 85-116 | 29-DEC-08 |
| <b>WG889415-9</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 112     |           | %     |     | 86-139 | 29-DEC-08 |
| <b>WG889415-3</b>          | <b>DUP</b>     | <b>L716654-10</b>      |         |           |       |     |        |           |
| Mercury (Hg)               |                | 0.0705                 | 0.0685  |           | mg/kg | 2.9 | 30     | 29-DEC-08 |
| <b>WG889415-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 29-DEC-08 |
| <b>WG889415-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 29-DEC-08 |
| <b>WG889415-8</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 29-DEC-08 |
| <b>Batch</b>               | <b>R773426</b> |                        |         |           |       |     |        |           |
| <b>WG889415-4</b>          | <b>DUP</b>     | <b>L719347-15</b>      |         |           |       |     |        |           |
| Mercury (Hg)               |                | 6.53                   | 5.39    |           | mg/kg | 19  | 30     | 29-DEC-08 |
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R773544</b> |                        |         |           |       |     |        |           |
| <b>WG889415-10</b>         | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 30      |           | %     |     | 23-32  | 29-DEC-08 |
| Arsenic (As)               |                |                        | 100     |           | %     |     | 91-115 | 29-DEC-08 |
| Beryllium (Be)             |                |                        | 16      |           | %     |     | 10-20  | 29-DEC-08 |
| Cadmium (Cd)               |                |                        | 138     |           | %     |     | 80-148 | 29-DEC-08 |
| Calcium (Ca)               |                |                        | 45      |           | %     |     | 36-48  | 29-DEC-08 |
| Chromium (Cr)              |                |                        | 56      |           | %     |     | 52-58  | 29-DEC-08 |
| Cobalt (Co)                |                |                        | 77      |           | %     |     | 70-79  | 29-DEC-08 |
| Copper (Cu)                |                |                        | 110     |           | %     |     | 95-115 | 29-DEC-08 |
| Iron (Fe)                  |                |                        | 83      |           | %     |     | 74-86  | 29-DEC-08 |
| Lead (Pb)                  |                |                        | 100     |           | %     |     | 85-109 | 29-DEC-08 |
| Lithium (Li)               |                |                        | 86      |           | %     |     | 65-95  | 29-DEC-08 |
| Magnesium (Mg)             |                |                        | 76      |           | %     |     | 69-80  | 29-DEC-08 |
| Nickel (Ni)                |                |                        | 82      |           | %     |     | 74-88  | 29-DEC-08 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                |                        |        |           |       |     |        |           |
| <b>Soil</b>                |                |                        |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R773544</b> |                        |        |           |       |     |        |           |
| <b>WG889415-10</b>         | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Phosphorus (P)             |                |                        | 105    |           | %     |     | 83-118 | 29-DEC-08 |
| Potassium (K)              |                |                        | 28     |           | %     |     | 21-31  | 29-DEC-08 |
| Strontium (Sr)             |                |                        | 27     |           | %     |     | 20-30  | 29-DEC-08 |
| Tin (Sn)                   |                |                        | 93     |           | %     |     | 77-116 | 29-DEC-08 |
| Titanium (Ti)              |                |                        | 21     |           | %     |     | 18-26  | 29-DEC-08 |
| Vanadium (V)               |                |                        | 63     |           | %     |     | 56-64  | 29-DEC-08 |
| Zinc (Zn)                  |                |                        | 102    |           | %     |     | 89-107 | 29-DEC-08 |
| Manganese (Mn)             |                |                        | 65     | RM-H      | %     |     | 58-65  | 29-DEC-08 |
| <b>WG889415-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28     |           | %     |     | 27-28  | 29-DEC-08 |
| Arsenic (As)               |                |                        | 92     |           | %     |     | 83-117 | 29-DEC-08 |
| Barium (Ba)                |                |                        | 13     |           | %     |     | 11-14  | 29-DEC-08 |
| Chromium (Cr)              |                |                        | 46     |           | %     |     | 39-50  | 29-DEC-08 |
| Copper (Cu)                |                |                        | 107    |           | %     |     | 93-112 | 29-DEC-08 |
| Iron (Fe)                  |                |                        | 73     |           | %     |     | 51-86  | 29-DEC-08 |
| Magnesium (Mg)             |                |                        | 53     |           | %     |     | 47-54  | 29-DEC-08 |
| Manganese (Mn)             |                |                        | 87     |           | %     |     | 75-89  | 29-DEC-08 |
| Nickel (Ni)                |                |                        | 76     |           | %     |     | 59-95  | 29-DEC-08 |
| Phosphorus (P)             |                |                        | 92     |           | %     |     | 84-101 | 29-DEC-08 |
| Potassium (K)              |                |                        | 4      |           | %     |     | 2-4    | 29-DEC-08 |
| Sodium (Na)                |                |                        | 2      |           | %     |     | 1-2    | 29-DEC-08 |
| Strontium (Sr)             |                |                        | 4      |           | %     |     | 3-4    | 29-DEC-08 |
| Vanadium (V)               |                |                        | 63     |           | %     |     | 53-68  | 29-DEC-08 |
| Zinc (Zn)                  |                |                        | 74     |           | %     |     | 66-81  | 29-DEC-08 |
| Beryllium (Be)             |                |                        | 23     | RM-H      | %     |     | 18-22  | 29-DEC-08 |
| Calcium (Ca)               |                |                        | 23     | RM-H      | %     |     | 12-22  | 29-DEC-08 |
| Cobalt (Co)                |                |                        | 78     | RM-H      | %     |     | 67-77  | 29-DEC-08 |
| Titanium (Ti)              |                |                        | 15     | RM-H      | %     |     | 7-13   | 29-DEC-08 |
| <b>WG889415-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 30     |           | %     |     | 23-32  | 29-DEC-08 |
| Arsenic (As)               |                |                        | 101    |           | %     |     | 91-115 | 29-DEC-08 |
| Beryllium (Be)             |                |                        | 17     |           | %     |     | 10-20  | 29-DEC-08 |
| Cadmium (Cd)               |                |                        | 133    |           | %     |     | 80-148 | 29-DEC-08 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R773544</b> |                        |        |           |       |     |        |           |
| <b>WG889415-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Calcium (Ca)               |                |                        | 46     |           | %     |     | 36-48  | 29-DEC-08 |
| Chromium (Cr)              |                |                        | 53     |           | %     |     | 52-58  | 29-DEC-08 |
| Cobalt (Co)                |                |                        | 77     |           | %     |     | 70-79  | 29-DEC-08 |
| Copper (Cu)                |                |                        | 107    |           | %     |     | 95-115 | 29-DEC-08 |
| Iron (Fe)                  |                |                        | 80     |           | %     |     | 74-86  | 29-DEC-08 |
| Lead (Pb)                  |                |                        | 95     |           | %     |     | 85-109 | 29-DEC-08 |
| Lithium (Li)               |                |                        | 86     |           | %     |     | 65-95  | 29-DEC-08 |
| Magnesium (Mg)             |                |                        | 74     |           | %     |     | 69-80  | 29-DEC-08 |
| Manganese (Mn)             |                |                        | 62     |           | %     |     | 58-65  | 29-DEC-08 |
| Nickel (Ni)                |                |                        | 81     |           | %     |     | 74-88  | 29-DEC-08 |
| Phosphorus (P)             |                |                        | 107    |           | %     |     | 83-118 | 29-DEC-08 |
| Potassium (K)              |                |                        | 27     |           | %     |     | 21-31  | 29-DEC-08 |
| Strontium (Sr)             |                |                        | 25     |           | %     |     | 20-30  | 29-DEC-08 |
| Tin (Sn)                   |                |                        | 79     |           | %     |     | 77-116 | 29-DEC-08 |
| Titanium (Ti)              |                |                        | 23     |           | %     |     | 18-26  | 29-DEC-08 |
| Vanadium (V)               |                |                        | 60     |           | %     |     | 56-64  | 29-DEC-08 |
| Zinc (Zn)                  |                |                        | 97     |           | %     |     | 89-107 | 29-DEC-08 |
| <b>WG889415-9</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28     |           | %     |     | 27-28  | 29-DEC-08 |
| Arsenic (As)               |                |                        | 88     |           | %     |     | 83-117 | 29-DEC-08 |
| Barium (Ba)                |                |                        | 13     |           | %     |     | 11-14  | 29-DEC-08 |
| Beryllium (Be)             |                |                        | 22     |           | %     |     | 18-22  | 29-DEC-08 |
| Calcium (Ca)               |                |                        | 20     |           | %     |     | 12-22  | 29-DEC-08 |
| Chromium (Cr)              |                |                        | 45     |           | %     |     | 39-50  | 29-DEC-08 |
| Cobalt (Co)                |                |                        | 74     |           | %     |     | 67-77  | 29-DEC-08 |
| Copper (Cu)                |                |                        | 109    |           | %     |     | 93-112 | 29-DEC-08 |
| Iron (Fe)                  |                |                        | 73     |           | %     |     | 51-86  | 29-DEC-08 |
| Magnesium (Mg)             |                |                        | 51     |           | %     |     | 47-54  | 29-DEC-08 |
| Manganese (Mn)             |                |                        | 85     |           | %     |     | 75-89  | 29-DEC-08 |
| Nickel (Ni)                |                |                        | 74     |           | %     |     | 59-95  | 29-DEC-08 |
| Phosphorus (P)             |                |                        | 91     |           | %     |     | 84-101 | 29-DEC-08 |
| Potassium (K)              |                |                        | 4      |           | %     |     | 2-4    | 29-DEC-08 |
| Sodium (Na)                |                |                        | 2      |           | %     |     | 1-2    | 29-DEC-08 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|------|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773544</b> |                        |        |           |       |      |       |           |
| <b>WG889415-9</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |      |       |           |
| Strontium (Sr)             |                |                        | 4      |           | %     |      | 3-4   | 29-DEC-08 |
| Vanadium (V)               |                |                        | 63     |           | %     |      | 53-68 | 29-DEC-08 |
| Zinc (Zn)                  |                |                        | 73     |           | %     |      | 66-81 | 29-DEC-08 |
| Titanium (Ti)              |                |                        | 14     | RM-H      | %     |      | 7-13  | 29-DEC-08 |
| <b>WG889415-3</b>          | <b>DUP</b>     | <b>L716654-10</b>      |        |           |       |      |       |           |
| Aluminum (Al)              |                | 19500                  | 19200  |           | mg/kg | 1.4  | 30    | 29-DEC-08 |
| Antimony (Sb)              |                | <10                    | <10    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Arsenic (As)               |                | <5.0                   | <5.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Barium (Ba)                |                | 10.8                   | 10.8   |           | mg/kg | 0.46 | 30    | 29-DEC-08 |
| Beryllium (Be)             |                | <0.50                  | <0.50  | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Bismuth (Bi)               |                | <20                    | <20    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Cadmium (Cd)               |                | <0.50                  | <0.50  | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Calcium (Ca)               |                | <50                    | <50    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Chromium (Cr)              |                | 4.6                    | 3.5    | J         | mg/kg | 1.1  | 8     | 29-DEC-08 |
| Cobalt (Co)                |                | <2.0                   | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Copper (Cu)                |                | 17.8                   | 17.4   |           | mg/kg | 2.1  | 30    | 29-DEC-08 |
| Iron (Fe)                  |                | 26800                  | 21100  |           | mg/kg | 24   | 30    | 29-DEC-08 |
| Lead (Pb)                  |                | <30                    | <30    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Lithium (Li)               |                | <2.0                   | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Magnesium (Mg)             |                | 290                    | 292    | J         | mg/kg | 2    | 200   | 29-DEC-08 |
| Manganese (Mn)             |                | 97.8                   | 111    |           | mg/kg | 13   | 30    | 29-DEC-08 |
| Molybdenum (Mo)            |                | <4.0                   | <4.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Nickel (Ni)                |                | <5.0                   | <5.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Phosphorus (P)             |                | 53                     | 52     | J         | mg/kg | 2    | 200   | 29-DEC-08 |
| Potassium (K)              |                | <200                   | <200   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Selenium (Se)              |                | <2.0                   | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Silver (Ag)                |                | <2.0                   | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Sodium (Na)                |                | <200                   | <200   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Strontium (Sr)             |                | 1.37                   | 1.37   | J         | mg/kg | 0.01 | 2     | 29-DEC-08 |
| Tin (Sn)                   |                | <5.0                   | <5.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Titanium (Ti)              |                | 102                    | 133    |           | mg/kg | 27   | 30    | 29-DEC-08 |
| Vanadium (V)               |                | 131                    | 119    |           | mg/kg | 9.6  | 30    | 29-DEC-08 |
| Zinc (Zn)                  |                | 14.2                   | 15.3   |           | mg/kg | 8.0  | 30    | 29-DEC-08 |



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| Test                       | Matrix         | Reference         | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|----------------------------|----------------|-------------------|--------|-----------|-------|------|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>       |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773544</b> |                   |        |           |       |      |       |           |
| <b>WG889415-4</b>          | <b>DUP</b>     | <b>L719347-15</b> |        |           |       |      |       |           |
| Aluminum (Al)              |                | 25900             | 23400  |           | mg/kg | 10   | 30    | 29-DEC-08 |
| Antimony (Sb)              |                | 130               | 120    |           | mg/kg | 7.4  | 30    | 29-DEC-08 |
| Arsenic (As)               |                | 45.0              | 48.1   | J         | mg/kg | 3.1  | 20    | 29-DEC-08 |
| Barium (Ba)                |                | 1230              | 1020   |           | mg/kg | 19   | 30    | 29-DEC-08 |
| Beryllium (Be)             |                | <0.50             | <0.50  | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Bismuth (Bi)               |                | <20               | <20    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Cadmium (Cd)               |                | 14.8              | 17.8   |           | mg/kg | 18   | 30    | 29-DEC-08 |
| Calcium (Ca)               |                | 25100             | 21600  |           | mg/kg | 15   | 30    | 29-DEC-08 |
| Chromium (Cr)              |                | 179               | 181    |           | mg/kg | 0.82 | 30    | 29-DEC-08 |
| Cobalt (Co)                |                | 25.4              | 23.4   |           | mg/kg | 8.4  | 30    | 29-DEC-08 |
| Copper (Cu)                |                | 5830              | 5300   |           | mg/kg | 9.7  | 30    | 29-DEC-08 |
| Iron (Fe)                  |                | 107000            | 124000 |           | mg/kg | 15   | 30    | 29-DEC-08 |
| Lead (Pb)                  |                | 3150              | 3400   |           | mg/kg | 7.5  | 30    | 29-DEC-08 |
| Lithium (Li)               |                | 12.6              | 11.9   | J         | mg/kg | 0.7  | 8     | 29-DEC-08 |
| Magnesium (Mg)             |                | 8890              | 8680   |           | mg/kg | 2.5  | 30    | 29-DEC-08 |
| Manganese (Mn)             |                | 1650              | 1260   |           | mg/kg | 27   | 30    | 29-DEC-08 |
| Molybdenum (Mo)            |                | 14.1              | 14.9   | J         | mg/kg | 0.8  | 16    | 29-DEC-08 |
| Nickel (Ni)                |                | 426               | 348    |           | mg/kg | 20   | 30    | 29-DEC-08 |
| Phosphorus (P)             |                | 1080              | 1080   |           | mg/kg | 0.35 | 30    | 29-DEC-08 |
| Potassium (K)              |                | 1080              | 1070   | J         | mg/kg | 10   | 800   | 29-DEC-08 |
| Selenium (Se)              |                | <7.0              | <7.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Silver (Ag)                |                | 2.6               | 3.0    | J         | mg/kg | 0.4  | 8     | 29-DEC-08 |
| Sodium (Na)                |                | 1420              | 1380   | J         | mg/kg | 50   | 800   | 29-DEC-08 |
| Strontium (Sr)             |                | 203               | 185    |           | mg/kg | 9.3  | 30    | 29-DEC-08 |
| Tin (Sn)                   |                | 315               | 207    | DUP-H     | mg/kg | 41   | 30    | 29-DEC-08 |
| Titanium (Ti)              |                | 1060              | 1020   |           | mg/kg | 4.0  | 30    | 29-DEC-08 |
| Vanadium (V)               |                | 206               | 163    |           | mg/kg | 23   | 30    | 29-DEC-08 |
| Zinc (Zn)                  |                | 4610              | 3880   |           | mg/kg | 17   | 30    | 29-DEC-08 |
| <b>WG889415-7</b>          | <b>DUP</b>     | <b>L719804-4</b>  |        |           |       |      |       |           |
| Aluminum (Al)              |                | 15000             | 15200  |           | mg/kg | 1.6  | 30    | 29-DEC-08 |
| Antimony (Sb)              |                | <10               | <10    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Arsenic (As)               |                | <5.0              | <5.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Barium (Ba)                |                | 90.2              | 104    |           | mg/kg | 15   | 30    | 29-DEC-08 |

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| Test                       | Matrix         | Reference        | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|----------------------------|----------------|------------------|--------|-----------|-------|------|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>      |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773544</b> |                  |        |           |       |      |       |           |
| <b>WG889415-7</b>          | <b>DUP</b>     | <b>L719804-4</b> |        |           |       |      |       |           |
| Beryllium (Be)             |                | <0.50            | <0.50  | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Bismuth (Bi)               |                | <20              | <20    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Cadmium (Cd)               |                | <0.50            | <0.50  | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Calcium (Ca)               |                | 3990             | 4000   |           | mg/kg | 0.25 | 30    | 29-DEC-08 |
| Chromium (Cr)              |                | 15.7             | 16.7   | J         | mg/kg | 0.9  | 8     | 29-DEC-08 |
| Cobalt (Co)                |                | 6.8              | 6.8    | J         | mg/kg | 0.0  | 8     | 29-DEC-08 |
| Copper (Cu)                |                | 20.5             | 20.6   |           | mg/kg | 0.82 | 30    | 29-DEC-08 |
| Iron (Fe)                  |                | 18900            | 18900  |           | mg/kg | 0.30 | 30    | 29-DEC-08 |
| Lead (Pb)                  |                | <30              | <30    | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Lithium (Li)               |                | 7.1              | 7.1    | J         | mg/kg | 0.0  | 8     | 29-DEC-08 |
| Magnesium (Mg)             |                | 4240             | 4120   |           | mg/kg | 3.0  | 30    | 29-DEC-08 |
| Manganese (Mn)             |                | 286              | 281    |           | mg/kg | 1.8  | 30    | 29-DEC-08 |
| Molybdenum (Mo)            |                | <4.0             | <4.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Nickel (Ni)                |                | 10.8             | 11.0   | J         | mg/kg | 0.2  | 20    | 29-DEC-08 |
| Phosphorus (P)             |                | 350              | 356    | J         | mg/kg | 6    | 200   | 29-DEC-08 |
| Potassium (K)              |                | 960              | 960    | J         | mg/kg | 0    | 800   | 29-DEC-08 |
| Selenium (Se)              |                | <2.0             | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Silver (Ag)                |                | <2.0             | <2.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Sodium (Na)                |                | 230              | 230    | J         | mg/kg | 0    | 800   | 29-DEC-08 |
| Strontium (Sr)             |                | 30.8             | 31.0   |           | mg/kg | 0.52 | 30    | 29-DEC-08 |
| Tin (Sn)                   |                | <5.0             | <5.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| Titanium (Ti)              |                | 595              | 615    |           | mg/kg | 3.4  | 30    | 29-DEC-08 |
| Vanadium (V)               |                | 47.9             | 48.4   |           | mg/kg | 0.97 | 30    | 29-DEC-08 |
| Zinc (Zn)                  |                | 39.8             | 38.5   |           | mg/kg | 3.2  | 30    | 29-DEC-08 |
| <b>WG889415-1</b>          | <b>MB</b>      |                  |        |           |       |      |       |           |
| Aluminum (Al)              |                |                  | <50    |           | mg/kg |      | 50    | 29-DEC-08 |
| Antimony (Sb)              |                |                  | <10    |           | mg/kg |      | 10    | 29-DEC-08 |
| Arsenic (As)               |                |                  | <5.0   |           | mg/kg |      | 5     | 29-DEC-08 |
| Barium (Ba)                |                |                  | <1.0   |           | mg/kg |      | 1     | 29-DEC-08 |
| Beryllium (Be)             |                |                  | <0.50  |           | mg/kg |      | 0.5   | 29-DEC-08 |
| Bismuth (Bi)               |                |                  | <20    |           | mg/kg |      | 20    | 29-DEC-08 |
| Cadmium (Cd)               |                |                  | <0.50  |           | mg/kg |      | 0.5   | 29-DEC-08 |
| Calcium (Ca)               |                |                  | <50    |           | mg/kg |      | 50    | 29-DEC-08 |

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| Test                       | Matrix         | Reference   | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b> |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R773544</b> |             |        |           |       |     |       |           |
| <b>WG889415-1</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Iron (Fe)                  |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 29-DEC-08 |
| Lithium (Li)               |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Magnesium (Mg)             |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Manganese (Mn)             |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Molybdenum (Mo)            |                |             | <4.0   |           | mg/kg |     | 4     | 29-DEC-08 |
| Nickel (Ni)                |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Phosphorus (P)             |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Potassium (K)              |                |             | <200   |           | mg/kg |     | 200   | 29-DEC-08 |
| Selenium (Se)              |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Silver (Ag)                |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Sodium (Na)                |                |             | <200   |           | mg/kg |     | 200   | 29-DEC-08 |
| Strontium (Sr)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Tin (Sn)                   |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Titanium (Ti)              |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Vanadium (V)               |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Zinc (Zn)                  |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| <b>WG889415-2</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Aluminum (Al)              |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 29-DEC-08 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Bismuth (Bi)               |                |             | <20    |           | mg/kg |     | 20    | 29-DEC-08 |
| Cadmium (Cd)               |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Calcium (Ca)               |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Iron (Fe)                  |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |

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| Test                       | Matrix         | Reference   | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b> |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R773544</b> |             |        |           |       |     |       |           |
| <b>WG889415-2</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 29-DEC-08 |
| Lithium (Li)               |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Magnesium (Mg)             |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Manganese (Mn)             |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Molybdenum (Mo)            |                |             | <4.0   |           | mg/kg |     | 4     | 29-DEC-08 |
| Nickel (Ni)                |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Phosphorus (P)             |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Potassium (K)              |                |             | <200   |           | mg/kg |     | 200   | 29-DEC-08 |
| Selenium (Se)              |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Silver (Ag)                |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Sodium (Na)                |                |             | <200   |           | mg/kg |     | 200   | 29-DEC-08 |
| Strontium (Sr)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Tin (Sn)                   |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Titanium (Ti)              |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Vanadium (V)               |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Zinc (Zn)                  |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| <b>WG889415-8</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Aluminum (Al)              |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 29-DEC-08 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 29-DEC-08 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Bismuth (Bi)               |                |             | <20    |           | mg/kg |     | 20    | 29-DEC-08 |
| Cadmium (Cd)               |                |             | <0.50  |           | mg/kg |     | 0.5   | 29-DEC-08 |
| Calcium (Ca)               |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |
| Iron (Fe)                  |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 29-DEC-08 |
| Lithium (Li)               |                |             | <2.0   |           | mg/kg |     | 2     | 29-DEC-08 |
| Magnesium (Mg)             |                |             | <50    |           | mg/kg |     | 50    | 29-DEC-08 |
| Manganese (Mn)             |                |             | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|------|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                |                        |        |           |       |      |       |           |
| <b>Soil</b>                |                |                        |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773544</b> |                        |        |           |       |      |       |           |
| <b>WG889415-8</b>          | <b>MB</b>      |                        |        |           |       |      |       |           |
| Molybdenum (Mo)            |                |                        | <4.0   |           | mg/kg |      | 4     | 29-DEC-08 |
| Nickel (Ni)                |                |                        | <5.0   |           | mg/kg |      | 5     | 29-DEC-08 |
| Phosphorus (P)             |                |                        | <50    |           | mg/kg |      | 50    | 29-DEC-08 |
| Potassium (K)              |                |                        | <200   |           | mg/kg |      | 200   | 29-DEC-08 |
| Selenium (Se)              |                |                        | <2.0   |           | mg/kg |      | 2     | 29-DEC-08 |
| Silver (Ag)                |                |                        | <2.0   |           | mg/kg |      | 2     | 29-DEC-08 |
| Sodium (Na)                |                |                        | <200   |           | mg/kg |      | 200   | 29-DEC-08 |
| Strontium (Sr)             |                |                        | <0.50  |           | mg/kg |      | 0.5   | 29-DEC-08 |
| Tin (Sn)                   |                |                        | <5.0   |           | mg/kg |      | 5     | 29-DEC-08 |
| Titanium (Ti)              |                |                        | <1.0   |           | mg/kg |      | 1     | 29-DEC-08 |
| Vanadium (V)               |                |                        | <2.0   |           | mg/kg |      | 2     | 29-DEC-08 |
| Zinc (Zn)                  |                |                        | <1.0   |           | mg/kg |      | 1     | 29-DEC-08 |
| <b>PH-1:2-VA</b>           |                |                        |        |           |       |      |       |           |
| <b>Soil</b>                |                |                        |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773084</b> |                        |        |           |       |      |       |           |
| <b>WG889415-3</b>          | <b>DUP</b>     | <b>L716654-10</b>      |        |           |       |      |       |           |
| pH                         |                | 4.90                   | 4.92   |           | pH    | 0.41 | 20    | 24-DEC-08 |
| <b>WG889415-4</b>          | <b>DUP</b>     | <b>L719347-15</b>      |        |           |       |      |       |           |
| pH                         |                | 7.98                   | 8.00   |           | pH    | 0.25 | 20    | 24-DEC-08 |
| <b>WG889415-7</b>          | <b>DUP</b>     | <b>L719804-4</b>       |        |           |       |      |       |           |
| pH                         |                | 7.30                   | 7.30   |           | pH    | 0.0  | 20    | 24-DEC-08 |
| <b>TL-CSR-MS-VA</b>        |                |                        |        |           |       |      |       |           |
| <b>Soil</b>                |                |                        |        |           |       |      |       |           |
| <b>Batch</b>               | <b>R773573</b> |                        |        |           |       |      |       |           |
| <b>WG889415-10</b>         | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |      |       |           |
| <b>WG889415-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |      |       |           |
| <b>WG889415-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |      |       |           |
| <b>WG889415-9</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |      |       |           |
| <b>WG889415-3</b>          | <b>DUP</b>     | <b>L716654-10</b>      |        |           |       |      |       |           |
| Thallium (Tl)              |                | <1.0                   | <1.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| <b>WG889415-4</b>          | <b>DUP</b>     | <b>L719347-15</b>      |        |           |       |      |       |           |
| Thallium (Tl)              |                | <1.0                   | <1.0   | RPD-NA    | mg/kg | N/A  | 30    | 29-DEC-08 |
| <b>WG889415-1</b>          | <b>MB</b>      |                        |        |           |       |      |       |           |
| Thallium (Tl)              |                |                        | <1.0   |           | mg/kg |      | 1     | 29-DEC-08 |
| <b>WG889415-2</b>          | <b>MB</b>      |                        |        |           |       |      |       |           |
| Thallium (Tl)              |                |                        | <1.0   |           | mg/kg |      | 1     | 29-DEC-08 |
| <b>WG889415-8</b>          | <b>MB</b>      |                        |        |           |       |      |       |           |

ALS Laboratory Group Quality Control Report

Workorder: L716654

Report Date: 29-DEC-08

Page 10 of 11

| Test          | Matrix  | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|---------------|---------|-----------|--------|-----------|-------|-----|-------|-----------|
| TL-CSR-MS-VA  | Soil    |           |        |           |       |     |       |           |
| Batch         | R773573 |           |        |           |       |     |       |           |
| WG889415-8    | MB      |           |        |           |       |     |       |           |
| Thallium (Tl) |         |           | <1.0   |           | mg/kg |     | 1     | 29-DEC-08 |

## ALS Laboratory Group Quality Control Report

Workorder: L716654

Report Date: 29-DEC-08

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**Legend:**

---

|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

**Sample Parameter Qualifier Definitions:**

---

| Qualifier | Description                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| DUP-H     | Duplicate results outside ALS DQO, due to sample heterogeneity.                                                                                      |
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                          |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                          |



Environmental Division

Chain of Custody / Analytical Request Form  
Canada Toll Free: 1 800 668 9878  
www.alsglobal.com

ATN: Glenys Weeks  
GOC #

|                                                                                                 |                                                                       |                                                                                                                                                                             |                 |                                                                                                                                                                                                                                                              |  |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Report to: Darcy Warner                                                                         |                                                                       | Report Format / Distribution                                                                                                                                                |                 | Service Requested: (rush - subject to a)                                                                                                                                                                                                                     |  |
| Company: Golden Associates Ltd                                                                  |                                                                       | <input type="checkbox"/> Standard <input type="checkbox"/> Other<br><input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital |                 | <input type="radio"/> Regular (Default)<br><input type="radio"/> Priority (2-3 Business Days) - 50% Surcharge<br><input type="radio"/> Emergency (1 Business Day) - 100% Surcharge<br><input type="radio"/> For Emergency < 1 Day, ASAP or Weekend - Contact |  |
| Contact: Mel Zweirink                                                                           |                                                                       | Email 1:                                                                                                                                                                    |                 | Analysis Request                                                                                                                                                                                                                                             |  |
| Address: 2535-3rd Ave SE                                                                        |                                                                       | Email 2:                                                                                                                                                                    |                 | Please indicate below Filtered, Preserved or                                                                                                                                                                                                                 |  |
| CARGARY AB T2A 7W5                                                                              |                                                                       |                                                                                                                                                                             |                 |                                                                                                                                                                                                                                                              |  |
| Phone: 403-206-4803 Fax: 403-299-5606                                                           |                                                                       | Client / Project Information:                                                                                                                                               |                 |                                                                                                                                                                                                                                                              |  |
| Invoice To: Same as Report? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |                                                                       | Job #:                                                                                                                                                                      |                 |                                                                                                                                                                                                                                                              |  |
| Company:                                                                                        |                                                                       | PO / AFE:                                                                                                                                                                   |                 |                                                                                                                                                                                                                                                              |  |
| Contact: ATTN: GLENYS WEEKS                                                                     |                                                                       | Legal Site Description:                                                                                                                                                     |                 |                                                                                                                                                                                                                                                              |  |
| Address: 1313-44 AVE. NE                                                                        |                                                                       |                                                                                                                                                                             |                 |                                                                                                                                                                                                                                                              |  |
| CARGARY AB T2E 6L5                                                                              |                                                                       | Quote #:                                                                                                                                                                    |                 |                                                                                                                                                                                                                                                              |  |
| Phone: 403-291-9897 Fax: 403-291-0298                                                           |                                                                       | ALS Contact:                                                                                                                                                                |                 |                                                                                                                                                                                                                                                              |  |
| Lab Work Order #                                                                                |                                                                       | ALS Contact:                                                                                                                                                                |                 |                                                                                                                                                                                                                                                              |  |
| 07-1334-0018                                                                                    |                                                                       |                                                                                                                                                                             |                 |                                                                                                                                                                                                                                                              |  |
| Sample #                                                                                        | Sample Identification<br>(This description will appear on the report) | Date<br>(dd-mm-yy)                                                                                                                                                          | Time<br>(hh:mm) | Sample Type                                                                                                                                                                                                                                                  |  |
| 1                                                                                               | PTM 001-01 (0-5 cm)                                                   | 12/10/08                                                                                                                                                                    |                 | 507L                                                                                                                                                                                                                                                         |  |
| 2                                                                                               | PTM 002-02 (5-30 cm)                                                  | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 3                                                                                               | PTM 001-02 (5-30 cm)                                                  | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 4                                                                                               | PTM 001-03 (30-60 cm)                                                 | 24/10/08                                                                                                                                                                    |                 | "                                                                                                                                                                                                                                                            |  |
| 5                                                                                               | PTM 001-04 (60-90 cm)                                                 | 12/10/08                                                                                                                                                                    |                 | "                                                                                                                                                                                                                                                            |  |
| 6                                                                                               | PTM 002-01 (0-5 cm)                                                   | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 7                                                                                               | PTM 002-03 (30-60 cm)                                                 | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 8                                                                                               | PTM 002-04 (60-90 cm)                                                 | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 9                                                                                               | PTM 003-01 (0-5 cm)                                                   | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 10                                                                                              | PTM 003-02 (5-30 cm)                                                  | 12/10/08                                                                                                                                                                    |                 | "                                                                                                                                                                                                                                                            |  |
| 11                                                                                              | PTM 003-03 (30-60 cm)                                                 | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |
| 12                                                                                              | PTM 003-04 (60-90 cm)                                                 | "                                                                                                                                                                           |                 | "                                                                                                                                                                                                                                                            |  |

Special Instructions / Regulations / Hazardous Details

Samples to be destroyed after analysis

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

|                               |              |                                   |           |                                      |              |
|-------------------------------|--------------|-----------------------------------|-----------|--------------------------------------|--------------|
| SHIPMENT RELEASE (client use) |              | SHIPMENT RECEPTION (lab use only) |           | SHIPMENT VERIFICATION (lab use only) |              |
| Released by:                  | Date & Time: | Received by:                      | Date:     | Time:                                | Temperature: |
|                               |              | Large Overhead                    | 10-Dec-08 | 08:50                                | 15°C         |

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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08/12/11 10:21





Environmental Division

|                                                     |                                                                                                         |                                                                            |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Report to: <i>Dorey Warner</i>                      | Report Format / Distribution                                                                            | Service Requested: (rush - subject to availability)                        |
| Company: <i>Golden Associates Ltd</i>               | <input type="checkbox"/> Standard <input type="checkbox"/> Other                                        | <input type="radio"/> Regular (Default)                                    |
| Contact: <i>Mel Zwirink</i>                         | <input checked="" type="checkbox"/> PDF <input type="checkbox"/> Excel <input type="checkbox"/> Digital | <input type="radio"/> Priority (2-3 Business Days) - 50% Surcharge         |
| Address: <i>2535 - 3rd Ave SE</i>                   | Email 1:                                                                                                | <input type="radio"/> Emergency (1 Business Day) - 100% Surcharge          |
| <i>Calgary, AB T2A 7W5</i>                          | Email 2:                                                                                                | <input type="radio"/> For Emergency < 1 Day, ASAP or Weekend - Contact ALS |
| Phone: <i>403-206-4803</i> Fax: <i>403-299-5606</i> |                                                                                                         |                                                                            |

|                                                                                           |                               |                                                                  |
|-------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------|
| Invoice To: Same as Report? <input checked="" type="radio"/> Yes <input type="radio"/> No | Client / Project Information: | Analysis Request<br>Please indicate below Filtered, Preserved or |
| Company:                                                                                  | Job #:                        |                                                                  |
| Contact: <i>ATN: GLENNYSS WEEKS</i>                                                       | PO / A/E:                     |                                                                  |
| Address: <i>1313-44 AVE. NE</i>                                                           | Legal Site Description:       |                                                                  |
| <i>CALGARY, AB T2E 6L5</i>                                                                |                               |                                                                  |

|                                                     |              |          |
|-----------------------------------------------------|--------------|----------|
| Phone: <i>403-291-9897</i> Fax: <i>403-291-0298</i> | Quote #:     | Sampler: |
| Lab Work Order #                                    | ALS Contact: |          |
| (lab use only)                                      |              |          |

| Sample # | Sample Identification<br>(This description will appear on the report) | Date<br>(dd-mm-yy) | Time<br>(hh:mm) | Sample Type |
|----------|-----------------------------------------------------------------------|--------------------|-----------------|-------------|
| 13       | PTM 004-01 (0-5cm)                                                    | 13/10/08           | N/A             | Soil        |
| 14       | PTM 004-02 (5-30cm)                                                   | 13/10/08           | "               | "           |
| 15       | PTM 004-03 (30-60cm)                                                  | "                  | "               | "           |
| 16       | PTM 004-04 (60-90cm)                                                  | "                  | "               | "           |
| 17       | PTM 005-01 (0-5cm)                                                    | 13/10/08           | "               | "           |
| 18       | PTM 005-02 (5-30cm)                                                   | "                  | "               | "           |
| 19       | PTM 005-03 (30-60cm)                                                  | "                  | "               | "           |
| 20       | PTM 005-04 (60-90cm)                                                  | "                  | "               | "           |

Special Instructions / Regulations / Hazardous Details

*Samples to be destroyed after analyses*

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

| SHIPMENT RELEASE (client use) |              | SHIPMENT RECEPTION (lab use only) |           | SHIPMENT VERIFICATION (lab use only) |              |
|-------------------------------|--------------|-----------------------------------|-----------|--------------------------------------|--------------|
| Released by:                  | Date & Time: | Received by:                      | Date:     | Temperature:                         | Verified by: |
|                               |              | <i>Angela D</i>                   | 10-Dec-08 | 08:50                                | 15°C         |

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*08/12/11 10:21*



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
ATTN: ADRIAN DE BRUYN  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Report Date: 06-MAY-09 11:27 (MT)  
Version: FINAL REV. 2

Lab Work Order #: **L719088**

Date Received: **16-DEC-08**

Project P.O. #:  
Job Reference: 07-1334-0018  
Legal Site Desc:  
CofC Numbers:

Other Information:

**Comments:**

May 6, 2009 - Boron and Silver data has been added to the tissue samples in this report. All other data remains unchanged.

Amber Springer  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-2                                    | L719088-6                                | L719088-10                                         | L719088-11                             | L719088-12                              |
|-----------------------------------------------------------------------|-----------------------------------|----------------------------------------------|------------------------------------------|----------------------------------------------------|----------------------------------------|-----------------------------------------|
|                                                                       |                                   | 04-OCT-08<br>11:00<br>0536584-0976500-LEAVES | 04-OCT-08<br><br>0536584-0976500-FRUTO 1 | 06-OCT-08<br><br>0536470-0978834-HOJAS B (ORGANIC) | <br><br>0534485-0976630-FRUIT (METALS) | <br><br>0534485-0976630-FRUTO (ORGANIC) |
| Grouping                                                              | Analyte                           |                                              |                                          |                                                    |                                        |                                         |
| TISSUE                                                                |                                   |                                              |                                          |                                                    |                                        |                                         |
| Physical Tests                                                        | % Moisture (%)                    | 67.6                                         | 78.2                                     | 73.4                                               | 86.2                                   | 86.3                                    |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 10000                                        | 69                                       | 49                                                 | 960                                    |                                         |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 3250                                         | 15.0                                     | 13.0                                               | 132                                    |                                         |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10                                        | <0.050                                   | <0.050                                             | <0.15                                  |                                         |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.020                                       | <0.010                                   | <0.010                                             | <0.010                                 |                                         |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.10                                        | <0.050                                   | <0.050                                             | <0.15                                  |                                         |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.020                                       | <0.010                                   | <0.010                                             | <0.010                                 |                                         |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 171                                          | 48.5                                     | 32.5                                               | 6.39                                   |                                         |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 55.6                                         | 10.6                                     | 8.66                                               | 0.881                                  |                                         |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60                                        | <0.30                                    | <0.30                                              | <0.90                                  |                                         |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.20                                        | <0.10                                    | <0.10                                              | <0.10                                  |                                         |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60                                        | <0.30                                    | <0.30                                              | <0.90                                  |                                         |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.060                                       | <0.030                                   | <0.030                                             | <0.030                                 |                                         |
|                                                                       | Boron (B)-Total (mg/kg)           | 81                                           | 44                                       | 26                                                 | 47                                     |                                         |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 26.4                                         | 9.6                                      | 6.8                                                | 6.4                                    |                                         |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.416                                        | <0.030                                   | 0.323                                              | 0.266                                  |                                         |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.135                                        | <0.0050                                  | 0.0858                                             | 0.0367                                 |                                         |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 9450                                         | 12300                                    | 20300                                              | 2720                                   |                                         |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 3060                                         | 2680                                     | 5400                                               | 375                                    |                                         |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 1.2                                          | <0.50                                    | 2.18                                               | <1.5                                   |                                         |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.38                                         | <0.10                                    | 0.58                                               | <0.10                                  |                                         |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 1.61                                         | 0.37                                     | <0.10                                              | <0.30                                  |                                         |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.522                                        | 0.081                                    | <0.020                                             | <0.020                                 |                                         |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 5.59                                         | 7.07                                     | 9.52                                               | 11.5                                   |                                         |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 1.81                                         | 1.54                                     | 2.53                                               | 1.58                                   |                                         |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 0.34                                         | 0.18                                     | <0.10                                              | <0.30                                  |                                         |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.111                                        | 0.039                                    | <0.020                                             | <0.020                                 |                                         |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0                                         | <0.50                                    | <0.50                                              | <1.5                                   |                                         |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.20                                        | <0.10                                    | <0.10                                              | <0.10                                  |                                         |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 7120                                         | 3410                                     | 2930                                               | 4950                                   |                                         |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 2310                                         | 744                                      | 778                                                | 683                                    |                                         |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 3000                                         | 889                                      | 111                                                | 28.5                                   |                                         |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 973                                          | 194                                      | 29.4                                               | 3.93                                   |                                         |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.158                                        | 0.0053                                   | 0.112                                              | <0.0050                                |                                         |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0512                                       | 0.0012                                   | 0.0297                                             | <0.0010                                |                                         |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.10                                        | <0.050                                   | 0.119                                              | 0.38                                   |                                         |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | <0.020                                       | <0.010                                   | 0.032                                              | 0.052                                  |                                         |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 2.1                                          | <0.50                                    | 1.72                                               | 2.1                                    |                                         |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.68                                         | <0.10                                    | 0.46                                               | 0.29                                   |                                         |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.59                                         | 0.22                                     | 0.38                                               | 0.29                                   |                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-13                               | L719088-15                              | L719088-17                               | L719088-19                           | L719088-22                               |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                   | 0534485-0976630-<br>LEAVES 1<br>(METALS) | 0534485-0976630-<br>LEAVES<br>(ORGANIC) | 0536353-0987255-<br>FRUITS A<br>(METALS) | 0536353-0987255-<br>FRUIT B (METALS) | 0536353-0987255-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                           |                                          |                                         |                                          |                                      |                                          |
| TISSUE                                                                |                                   |                                          |                                         |                                          |                                      |                                          |
| Physical Tests                                                        | % Moisture (%)                    | 69.3                                     | 69.4                                    | 75.7                                     | 78.7                                 | 60.3                                     |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 5420                                     |                                         | <10                                      | 198                                  | 23                                       |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 1670                                     |                                         | 2.3                                      | 42.2                                 | 9.0                                      |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050                                   |                                         | <0.050                                   | <0.050                               | <0.050                                   |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                                   |                                         | <0.010                                   | <0.010                               | <0.010                                   |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050                                   |                                         | <0.050                                   | <0.050                               | <0.050                                   |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                                   |                                         | <0.010                                   | <0.010                               | <0.010                                   |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 7.96                                     |                                         | 1.48                                     | 40.3                                 | 0.751                                    |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 2.45                                     |                                         | 0.360                                    | 8.59                                 | 0.298                                    |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                                    |                                         | <0.30                                    | <0.30                                | <0.30                                    |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                    |                                         | <0.10                                    | <0.10                                | <0.10                                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                                    |                                         | <0.30                                    | <0.30                                | <0.30                                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                                   |                                         | <0.030                                   | <0.030                               | <0.030                                   |
|                                                                       | Boron (B)-Total (mg/kg)           | 38                                       |                                         | 16                                       | 37                                   | 30                                       |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 11.8                                     |                                         | 3.9                                      | 7.8                                  | 12.1                                     |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.111                                    |                                         | <0.030                                   | 0.043                                | <0.030                                   |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0343                                   |                                         | <0.0050                                  | 0.0092                               | <0.0050                                  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 2840                                     |                                         | 1570                                     | 3720                                 | 647                                      |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 874                                      |                                         | 382                                      | 795                                  | 257                                      |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 0.62                                     |                                         | <0.50                                    | <0.50                                | 6.75                                     |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.19                                     |                                         | <0.10                                    | <0.10                                | 2.68                                     |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10                                    |                                         | <0.10                                    | 0.21                                 | <0.10                                    |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020                                   |                                         | <0.020                                   | 0.046                                | 0.028                                    |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 8.89                                     |                                         | 16.4                                     | 15.3                                 | 8.26                                     |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 2.73                                     |                                         | 4.00                                     | 3.26                                 | 3.28                                     |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10                                    |                                         | <0.10                                    | 0.14                                 | <0.10                                    |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020                                   |                                         | <0.020                                   | 0.030                                | <0.020                                   |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                                    |                                         | <0.50                                    | <0.50                                | <0.50                                    |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                    |                                         | <0.10                                    | <0.10                                | <0.10                                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 5070                                     |                                         | 1820                                     | 2850                                 | 750                                      |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 1560                                     |                                         | 443                                      | 608                                  | 298                                      |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 34.9                                     |                                         | 109                                      | 26.7                                 | 65.7                                     |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 10.7                                     |                                         | 26.5                                     | 5.70                                 | 26.1                                     |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.107                                    |                                         | <0.0050                                  | <0.0050                              | 0.0554                                   |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0329                                   |                                         | <0.0010                                  | <0.0010                              | 0.0220                                   |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.108                                    |                                         | <0.050                                   | 0.504                                | 0.137                                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.033                                    |                                         | <0.010                                   | 0.108                                | 0.055                                    |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 1.93                                     |                                         | <0.50                                    | 1.16                                 | 2.71                                     |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.59                                     |                                         | 0.11                                     | 0.25                                 | 1.08                                     |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.17                                     |                                         | 0.87                                     | 0.14                                 | 1.18                                     |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-25                               | L719088-26                         | L719088-27                               | L719088-28                           | L719088-31                                |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|------------------------------------|------------------------------------------|--------------------------------------|-------------------------------------------|
|                                                                       |                                   | 0536353-0987255-<br>LEAVES B<br>(METALS) | 0539137-0978302-<br>FRUIT (METALS) | 0539137-0978302-<br>FRUTO 1<br>(ORGANIC) | 0539137-0978302-<br>FRUIT 1 (METALS) | 0539137-0978302-<br>LEAVES 1<br>(ORGANIC) |
| Grouping                                                              | Analyte                           |                                          |                                    |                                          |                                      |                                           |
| TISSUE                                                                |                                   |                                          |                                    |                                          |                                      |                                           |
| Physical Tests                                                        | % Moisture (%)                    | 79.4                                     | 77.3                               | 76.9                                     | 76.5                                 | 71.1                                      |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 252                                      | <10                                |                                          | 10600                                |                                           |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 51.9                                     | <2.0                               |                                          | 2480                                 |                                           |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050                                   | <0.050                             |                                          | <0.10                                |                                           |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                                   | <0.010                             |                                          | <0.020                               |                                           |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050                                   | <0.050                             |                                          | <0.10                                |                                           |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                                   | <0.010                             |                                          | <0.020                               |                                           |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 37.9                                     | 10.9                               |                                          | 25.2                                 |                                           |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 7.82                                     | 2.49                               |                                          | 5.92                                 |                                           |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                                    | <0.30                              |                                          | <0.60                                |                                           |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                    | <0.10                              |                                          | <0.20                                |                                           |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                                    | <0.30                              |                                          | <0.60                                |                                           |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                                   | <0.030                             |                                          | <0.060                               |                                           |
|                                                                       | Boron (B)-Total (mg/kg)           | 56                                       | 64                                 |                                          | 82                                   |                                           |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 11.5                                     | 14.6                               |                                          | 19.3                                 |                                           |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.054                                    | <0.030                             |                                          | 0.124                                |                                           |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0111                                   | <0.0050                            |                                          | 0.029                                |                                           |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 3890                                     | 2050                               |                                          | 10100                                |                                           |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 802                                      | 466                                |                                          | 2390                                 |                                           |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 0.75                                     | <0.50                              |                                          | 9.8                                  |                                           |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.16                                     | <0.10                              |                                          | 2.30                                 |                                           |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.12                                     | <0.10                              |                                          | 0.31                                 |                                           |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.025                                    | <0.020                             |                                          | 0.072                                |                                           |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 13.7                                     | 23.7                               |                                          | 7.83                                 |                                           |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 2.81                                     | 5.40                               |                                          | 1.84                                 |                                           |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 0.53                                     | <0.10                              |                                          | <0.20                                |                                           |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.109                                    | <0.020                             |                                          | <0.040                               |                                           |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                                    | <0.50                              |                                          | <1.0                                 |                                           |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                    | <0.10                              |                                          | <0.20                                |                                           |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1850                                     | 2590                               |                                          | 5380                                 |                                           |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 381                                      | 589                                |                                          | 1270                                 |                                           |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 31.6                                     | 31.6                               |                                          | 103                                  |                                           |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 6.51                                     | 7.18                               |                                          | 24.3                                 |                                           |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0560                                   | 0.0286                             |                                          | 0.0105                               |                                           |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0115                                   | 0.0065                             |                                          | 0.0025                               |                                           |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.264                                    | 0.068                              |                                          | <0.10                                |                                           |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.054                                    | 0.015                              |                                          | <0.020                               |                                           |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 0.57                                     | 7.44                               |                                          | 2.0                                  |                                           |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.12                                     | 1.69                               |                                          | 0.47                                 |                                           |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.16                                     | 0.16                               |                                          | 0.37                                 |                                           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-32                               | L719088-35                             | L719088-36                               | L719088-38                               | L719088-40                              |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|------------------------------------------|-----------------------------------------|
|                                                                       |                                   | 04-OCT-08                                | 04-OCT-08                              | 06-OCT-08                                | 06-OCT-08                                | 06-OCT-08                               |
|                                                                       |                                   | 0539137-0978302-<br>LEAVES 1<br>(METALS) | 0539137-0978302-<br>LEAVES<br>(METALS) | 0536450-<br>09878838-FRUTO<br>A (METALS) | 0536450-<br>09878838-FRUTO<br>B (METALS) | 0536450-<br>09878838-HOJA A<br>(METALS) |
| Grouping                                                              | Analyte                           |                                          |                                        |                                          |                                          |                                         |
| TISSUE                                                                |                                   |                                          |                                        |                                          |                                          |                                         |
| Physical Tests                                                        | % Moisture (%)                    | 71.2                                     | 66.7                                   | 85.5                                     | 64.1                                     | 76.2                                    |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 10600                                    | 98                                     | <30                                      | <10                                      | 114                                     |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 3050                                     | 32.7                                   | 3.8                                      | <2.0                                     | 27.0                                    |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.10                                    | <0.050                                 | <0.15                                    | <0.050                                   | <0.050                                  |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.020                                   | <0.010                                 | <0.010                                   | <0.010                                   | <0.010                                  |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.10                                    | <0.050                                 | <0.15                                    | <0.050                                   | <0.050                                  |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.020                                   | <0.010                                 | <0.010                                   | <0.010                                   | <0.010                                  |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 27.1                                     | 41.8                                   | 31.8                                     | 4.21                                     | 211                                     |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 7.79                                     | 13.9                                   | 4.62                                     | 1.51                                     | 50.3                                    |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.60                                    | <0.30                                  | <0.90                                    | <0.30                                    | <0.30                                   |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.20                                    | <0.10                                  | <0.10                                    | <0.10                                    | <0.10                                   |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.60                                    | <0.30                                  | <0.90                                    | <0.30                                    | <0.30                                   |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.060                                   | <0.030                                 | <0.030                                   | <0.030                                   | <0.030                                  |
|                                                                       | Boron (B)-Total (mg/kg)           | 141                                      | 128                                    | 36                                       | 15                                       | 60                                      |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 40.5                                     | 42.4                                   | 5.2                                      | 5.5                                      | 14.3                                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.072                                    | <0.030                                 | <0.090                                   | 0.077                                    | 0.155                                   |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.021                                    | 0.0056                                 | <0.0050                                  | 0.0275                                   | 0.0368                                  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 12100                                    | 7450                                   | 3180                                     | 3700                                     | 28100                                   |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 3470                                     | 2480                                   | 462                                      | 1330                                     | 6690                                    |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 11.0                                     | 0.88                                   | 1.5                                      | <0.50                                    | 0.63                                    |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 3.17                                     | 0.29                                   | 0.22                                     | <0.10                                    | 0.15                                    |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.56                                     | <0.10                                  | <0.30                                    | <0.10                                    | <0.10                                   |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.162                                    | <0.020                                 | <0.020                                   | <0.020                                   | <0.020                                  |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 6.12                                     | 16.9                                   | 28.1                                     | 10.6                                     | 10.3                                    |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 1.76                                     | 5.61                                   | 4.08                                     | 3.79                                     | 2.46                                    |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 0.21                                     | 0.44                                   | <0.30                                    | <0.10                                    | 0.27                                    |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 0.062                                    | 0.147                                  | <0.020                                   | <0.020                                   | 0.064                                   |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <1.0                                     | <0.50                                  | <1.5                                     | <0.50                                    | <0.50                                   |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.20                                    | <0.10                                  | <0.10                                    | <0.10                                    | <0.10                                   |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 6020                                     | 5760                                   | 1400                                     | 1280                                     | 5570                                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 1730                                     | 1920                                   | 203                                      | 460                                      | 1320                                    |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 251                                      | 67.7                                   | 16.3                                     | 19.4                                     | 95.3                                    |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 72.3                                     | 22.5                                   | 2.37                                     | 6.97                                     | 22.7                                    |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0707                                   | 0.0733                                 | 0.0282                                   | <0.0050                                  | 0.0497                                  |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0203                                   | 0.0244                                 | 0.0041                                   | 0.0017                                   | 0.0118                                  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.10                                    | 0.075                                  | 1.70                                     | 0.742                                    | 0.755                                   |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | <0.020                                   | 0.025                                  | 0.247                                    | 0.266                                    | 0.180                                   |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 1.9                                      | 26.2                                   | 1.9                                      | 0.62                                     | 1.12                                    |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.55                                     | 8.70                                   | 0.28                                     | 0.22                                     | 0.27                                    |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.34                                     | 0.36                                   | 0.30                                     | 0.17                                     | 0.27                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-43                           | L719088-47                               | L719088-52                         | L719088-56                               | L719088-60                         |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|------------------------------------|
|                                                                       |                                   | 07-OCT-08                            | 07-OCT-08                                | 04-OCT-08<br>08:00                 | 04-OCT-08<br>08:00                       | 05-OCT-08                          |
|                                                                       |                                   | 0529754-0981600-<br>FRUIT 1 (METALS) | 0529754-0981600-<br>LEAVES 1<br>(METALS) | 0538538-0980036-<br>FRUTO (METALS) | 0538538-0980036-<br>LEAVES 1<br>(METALS) | 0536226-0982152-<br>FRUIT (METALS) |
| Grouping                                                              | Analyte                           |                                      |                                          |                                    |                                          |                                    |
| TISSUE                                                                |                                   |                                      |                                          |                                    |                                          |                                    |
| Physical Tests                                                        | % Moisture (%)                    | 75.8                                 | 78.3                                     | 52.5                               | 57.2                                     | 76.1                               |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 15                                   | 63                                       | 14                                 | 33                                       | 11                                 |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 3.6                                  | 13.7                                     | 6.8                                | 13.9                                     | 2.5                                |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050                               | <0.050                                   | <0.050                             | <0.050                                   | <0.050                             |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                               | <0.010                                   | <0.010                             | <0.010                                   | <0.010                             |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050                               | <0.050                                   | <0.050                             | <0.050                                   | <0.050                             |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                               | <0.010                                   | <0.010                             | <0.010                                   | <0.010                             |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 21.7                                 | 47.0                                     | 5.76                               | 20.1                                     | 11.2                               |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 5.25                                 | 10.2                                     | 2.73                               | 8.60                                     | 2.69                               |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                                | <0.30                                    | <0.30                              | <0.30                                    | <0.30                              |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                | <0.10                                    | <0.10                              | <0.10                                    | <0.10                              |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                                | <0.30                                    | <0.30                              | <0.30                                    | <0.30                              |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                               | <0.030                                   | <0.030                             | <0.030                                   | <0.030                             |
|                                                                       | Boron (B)-Total (mg/kg)           | 21                                   | 34                                       | 14                                 | 26                                       | 45                                 |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 5.0                                  | 7.3                                      | 6.7                                | 11.1                                     | 10.7                               |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | <0.030                               | 0.079                                    | <0.030                             | 0.048                                    | 0.060                              |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0069                               | 0.0171                                   | 0.0095                             | 0.0207                                   | 0.0144                             |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 4260                                 | 6380                                     | 847                                | 4730                                     | 3630                               |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 1030                                 | 1390                                     | 402                                | 2020                                     | 870                                |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 0.73                                 | <0.50                                    | <0.50                              | 3.08                                     | <0.50                              |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 0.18                                 | <0.10                                    | 0.12                               | 1.32                                     | <0.10                              |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.22                                 | 0.33                                     | <0.10                              | <0.10                                    | 0.66                               |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.054                                | 0.071                                    | <0.020                             | <0.020                                   | 0.158                              |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 13.7                                 | 28.4                                     | 9.34                               | 5.24                                     | 16.4                               |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 3.30                                 | 6.17                                     | 4.44                               | 2.24                                     | 3.93                               |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10                                | <0.10                                    | <0.10                              | <0.10                                    | <0.10                              |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020                               | <0.020                                   | <0.020                             | 0.026                                    | <0.020                             |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                                | 1.31                                     | <0.50                              | <0.50                                    | <0.50                              |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                | 0.28                                     | <0.10                              | <0.10                                    | <0.10                              |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 2550                                 | 3870                                     | 1220                               | 2170                                     | 1580                               |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 616                                  | 841                                      | 581                                | 928                                      | 379                                |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 343                                  | 526                                      | 16.0                               | 44.9                                     | 18.5                               |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 82.9                                 | 114                                      | 7.60                               | 19.2                                     | 4.42                               |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | <0.0050                              | 0.0216                                   | <0.0050                            | 0.0582                                   | <0.0050                            |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | <0.0010                              | 0.0047                                   | <0.0010                            | 0.0249                                   | <0.0010                            |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 1.36                                 | 1.59                                     | 1.85                               | 4.05                                     | 0.112                              |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.329                                | 0.345                                    | 0.880                              | 1.73                                     | 0.027                              |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 0.50                                 | <0.50                                    | <0.50                              | 1.31                                     | <0.50                              |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.12                                 | <0.10                                    | <0.10                              | 0.56                                     | <0.10                              |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.29                                 | 0.11                                     | 0.14                               | 0.70                                     | 0.17                               |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-61                           | L719088-63                               | L719088-65                          | L719088-68                           | L719088-72                               |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                   | 05-OCT-08                            | 05-OCT-08                                | 05-OCT-08                           | 06-OCT-08                            | 06-OCT-08                                |
|                                                                       |                                   | 0536226-0982152-<br>FRUIT A (METALS) | 0536226-0982152-<br>LEAVES A<br>(METALS) | 0536226-0982152-<br>HOJA B (METALS) | 0538340-0981770-<br>FRUIT 1 (METALS) | 0538340-0981770-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                           |                                      |                                          |                                     |                                      |                                          |
| TISSUE                                                                |                                   |                                      |                                          |                                     |                                      |                                          |
| Physical Tests                                                        | % Moisture (%)                    | 88.9                                 | 84.1                                     | 71.1                                | 85.4                                 | 78.8                                     |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | <40                                  | 14                                       | 28                                  | 24000                                | 23700                                    |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | <2.0                                 | 2.2                                      | 8.1                                 | 3520                                 | 5010                                     |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.20                                | <0.050                                   | <0.050                              | <0.10                                | <0.20                                    |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                               | <0.010                                   | <0.010                              | <0.020                               | <0.040                                   |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.20                                | <0.050                                   | <0.050                              | <0.10                                | <0.20                                    |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                               | <0.010                                   | <0.010                              | <0.020                               | <0.040                                   |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 116                                  | 17.4                                     | 31.0                                | 232                                  | 158                                      |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 12.8                                 | 2.77                                     | 8.96                                | 34.0                                 | 33.4                                     |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <1.2                                 | <0.30                                    | <0.30                               | <0.60                                | <1.2                                     |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                                | <0.10                                    | <0.10                               | <0.20                                | <0.40                                    |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <1.2                                 | <0.30                                    | <0.30                               | <0.60                                | <1.2                                     |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                               | <0.030                                   | <0.030                              | <0.060                               | <0.12                                    |
|                                                                       | Boron (B)-Total (mg/kg)           | 54                                   | 25                                       | 43                                  | 43                                   | 51                                       |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 6.0                                  | 4.0                                      | 12.4                                | 6.3                                  | 10.9                                     |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 0.18                                 | 0.032                                    | 0.186                               | 0.161                                | <0.12                                    |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0205                               | 0.0051                                   | 0.0538                              | 0.024                                | <0.020                                   |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 6670                                 | 2950                                     | 8270                                | 8110                                 | 9110                                     |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 739                                  | 471                                      | 2390                                | 1190                                 | 1930                                     |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | <2.0                                 | 1.69                                     | <0.50                               | <1.0                                 | <2.0                                     |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | <0.10                                | 0.27                                     | 0.12                                | <0.20                                | <0.40                                    |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.40                                | <0.10                                    | 0.13                                | <0.20                                | <0.40                                    |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.020                                | <0.020                                   | 0.039                               | <0.040                               | <0.080                                   |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 19.9                                 | 18.4                                     | 13.0                                | 8.40                                 | 5.16                                     |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 2.21                                 | 2.93                                     | 3.76                                | 1.23                                 | 1.09                                     |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.40                                | <0.10                                    | <0.10                               | <0.20                                | <0.40                                    |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020                               | <0.020                                   | 0.024                               | <0.040                               | <0.080                                   |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <2.0                                 | <0.50                                    | <0.50                               | <1.0                                 | <2.0                                     |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                                | <0.10                                    | <0.10                               | <0.20                                | <0.40                                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 3320                                 | 2320                                     | 2230                                | 20600                                | 14600                                    |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 368                                  | 369                                      | 645                                 | 3020                                 | 3100                                     |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 1680                                 | 369                                      | 73.2                                | 586                                  | 355                                      |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 186                                  | 58.8                                     | 21.2                                | 85.9                                 | 75.0                                     |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | <0.0050                              | 0.0399                                   | 0.0741                              | 0.0336                               | 0.0810                                   |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | <0.0010                              | 0.0064                                   | 0.0215                              | 0.0049                               | 0.0172                                   |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | <0.20                                | 0.095                                    | 0.052                               | <0.10                                | <0.20                                    |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.011                                | 0.015                                    | 0.015                               | <0.020                               | <0.040                                   |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <2.0                                 | 1.55                                     | <0.50                               | 3.3                                  | 5.0                                      |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.10                                 | 0.25                                     | <0.10                               | 0.49                                 | 1.06                                     |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.26                                 | 0.28                                     | 0.14                                | <0.10                                | 0.21                                     |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-76                        | L719088-80                         |  |  |
|-----------------------------------------------------------------------|-----------------------------------|-----------------------------------|------------------------------------|--|--|
|                                                                       |                                   | 05-OCT-08                         | 05-OCT-08                          |  |  |
|                                                                       |                                   | 0533588-09996774-FRUIT 1 (METALS) | 0533588-09996774-LEAVES 1 (METALS) |  |  |
| Grouping                                                              | Analyte                           |                                   |                                    |  |  |
| TISSUE                                                                |                                   |                                   |                                    |  |  |
| Physical Tests                                                        | % Moisture (%)                    | 77.7                              | 71.8                               |  |  |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 4750                              | 12600                              |  |  |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 1060                              | 3540                               |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.050                            | <0.10                              |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.010                            | <0.020                             |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg)        | <0.050                            | <0.10                              |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | <0.010                            | <0.020                             |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 4.59                              | 5.53                               |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 1.03                              | 1.56                               |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <0.30                             | <0.60                              |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.10                             | <0.20                              |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <0.30                             | <0.60                              |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.030                            | <0.060                             |  |  |
|                                                                       | Boron (B)-Total (mg/kg)           | 33                                | 57                                 |  |  |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | 7.3                               | 16.2                               |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | <0.030                            | <0.060                             |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.0054                            | <0.010                             |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 12700                             | 10500                              |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 2830                              | 2950                               |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | <0.50                             | <1.0                               |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | <0.10                             | <0.20                              |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | <0.10                             | <0.20                              |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | <0.020                            | <0.040                             |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 12.6                              | 4.90                               |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 2.81                              | 1.38                               |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg)           | <0.10                             | <0.20                              |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | <0.020                            | 0.045                              |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <0.50                             | <1.0                               |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.10                             | <0.20                              |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 4430                              | 4450                               |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 990                               | 1250                               |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 42.7                              | 55.4                               |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 9.53                              | 15.6                               |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.0124                            | 0.109                              |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.0028                            | 0.0308                             |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 1.47                              | 0.39                               |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.328                             | 0.111                              |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 1.14                              | <1.0                               |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 0.26                              | <0.20                              |  |  |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 0.27                              | 0.16                               |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-2                                        | L719088-6                                    | L719088-10                                                | L719088-11                         | L719088-12                             |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------------------|----------------------------------------------|-----------------------------------------------------------|------------------------------------|----------------------------------------|
|                                                                       |                                   | 04-OCT-08<br>11:00<br>0536584-0976500-<br>LEAVES | 04-OCT-08<br><br>0536584-0976500-<br>FRUTO 1 | 06-OCT-08<br><br>0536470-0978834-<br>HOJAS B<br>(ORGANIC) | 0534485-0976630-<br>FRUIT (METALS) | 0534485-0976630-<br>FRUTO<br>(ORGANIC) |
| Grouping                                                              | Analyte                           |                                                  |                                              |                                                           |                                    |                                        |
| <b>TISSUE</b>                                                         |                                   |                                                  |                                              |                                                           |                                    |                                        |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.190                                            | 0.048                                        | 0.102                                                     | 0.040                              |                                        |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.060                                           | <0.030                                       | <0.030                                                    | <0.030                             |                                        |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.020                                           | <0.010                                       | <0.010                                                    | <0.010                             |                                        |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 265                                              | 119                                          | 143                                                       | 51.5                               |                                        |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 86.0                                             | 26.0                                         | 38.0                                                      | 7.11                               |                                        |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.060                                           | <0.030                                       | <0.030                                                    | <0.090                             |                                        |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.020                                           | <0.010                                       | <0.010                                                    | <0.010                             |                                        |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.40                                            | <0.20                                        | <0.20                                                     | <0.60                              |                                        |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.10                                            | <0.050                                       | <0.050                                                    | <0.050                             |                                        |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.020                                           | <0.010                                       | <0.010                                                    | <0.030                             |                                        |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0040                                          | <0.0020                                      | <0.0020                                                   | <0.0020                            |                                        |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <1.0                                             | <0.50                                        | <0.50                                                     | <1.5                               |                                        |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.20                                            | <0.10                                        | <0.10                                                     | <0.10                              |                                        |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 103                                              | 6.89                                         | 22.3                                                      | 27.9                               |                                        |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 33.4                                             | 1.50                                         | 5.94                                                      | 3.85                               |                                        |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Acenaphthylene (mg/kg)            |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Anthracene (mg/kg)                |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Anthracene (mg/kg wwt)            |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Chrysene (mg/kg)                  |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Chrysene (mg/kg wwt)              |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Fluoranthene (mg/kg)              |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Fluorene (mg/kg)                  |                                                  |                                              |                                                           |                                    | <0.060                                 |
|                                                                       | Fluorene (mg/kg wwt)              |                                                  |                                              |                                                           |                                    | <0.010                                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-13                               | L719088-15                              | L719088-17                               | L719088-19                           | L719088-22                               |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                   | 0534485-0976630-<br>LEAVES 1<br>(METALS) | 0534485-0976630-<br>LEAVES<br>(ORGANIC) | 0536353-0987255-<br>FRUITS A<br>(METALS) | 0536353-0987255-<br>FRUIT B (METALS) | 0536353-0987255-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                           |                                          |                                         |                                          |                                      |                                          |
| <b>TISSUE</b>                                                         |                                   |                                          |                                         |                                          |                                      |                                          |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.051                                    |                                         | 0.212                                    | 0.031                                | 0.469                                    |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                                   |                                         | <0.030                                   | <0.030                               | <0.030                                   |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                                   |                                         | <0.010                                   | <0.010                               | <0.010                                   |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 58.4                                     |                                         | 8.37                                     | 47.5                                 | 3.13                                     |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 18.0                                     |                                         | 2.04                                     | 10.1                                 | 1.24                                     |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030                                   |                                         | <0.030                                   | <0.030                               | <0.030                                   |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                                   |                                         | <0.010                                   | <0.010                               | <0.010                                   |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20                                    |                                         | <0.20                                    | <0.20                                | <0.20                                    |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                                   |                                         | <0.050                                   | <0.050                               | <0.050                                   |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010                                   |                                         | <0.010                                   | <0.010                               | <0.010                                   |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                                  |                                         | <0.0020                                  | <0.0020                              | <0.0020                                  |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50                                    |                                         | <0.50                                    | <0.50                                | <0.50                                    |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                    |                                         | <0.10                                    | <0.10                                | <0.10                                    |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 12.7                                     |                                         | 25.7                                     | 36.4                                 | 12.8                                     |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 3.91                                     |                                         | 6.24                                     | 7.77                                 | 5.08                                     |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Acenaphthylene (mg/kg)            |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Anthracene (mg/kg)                |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Anthracene (mg/kg wwt)            |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Chrysene (mg/kg)                  |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Chrysene (mg/kg wwt)              |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Fluoranthene (mg/kg)              |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Fluorene (mg/kg)                  |                                          | <0.30                                   |                                          |                                      |                                          |
|                                                                       | Fluorene (mg/kg wwt)              |                                          | <0.090                                  |                                          |                                      |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-25                               | L719088-26                         | L719088-27                               | L719088-28                           | L719088-31                                |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|------------------------------------|------------------------------------------|--------------------------------------|-------------------------------------------|
|                                                                       |                                   | 0536353-0987255-<br>LEAVES B<br>(METALS) | 0539137-0978302-<br>FRUIT (METALS) | 0539137-0978302-<br>FRUTO 1<br>(ORGANIC) | 0539137-0978302-<br>FRUIT 1 (METALS) | 0539137-0978302-<br>LEAVES 1<br>(ORGANIC) |
| Grouping                                                              | Analyte                           |                                          |                                    |                                          |                                      |                                           |
| <b>TISSUE</b>                                                         |                                   |                                          |                                    |                                          |                                      |                                           |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.032                                    | 0.036                              |                                          | 0.087                                |                                           |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                                   | <0.030                             |                                          | <0.060                               |                                           |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                                   | <0.010                             |                                          | <0.020                               |                                           |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 47.6                                     | 14.2                               |                                          | 121                                  |                                           |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 9.81                                     | 3.24                               |                                          | 28.5                                 |                                           |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030                                   | 0.113                              |                                          | <0.060                               |                                           |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                                   | 0.026                              |                                          | <0.020                               |                                           |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20                                    | <0.20                              |                                          | <0.40                                |                                           |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                                   | <0.050                             |                                          | <0.10                                |                                           |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010                                   | <0.010                             |                                          | <0.020                               |                                           |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                                  | <0.0020                            |                                          | <0.0040                              |                                           |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50                                    | <0.50                              |                                          | <1.0                                 |                                           |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                    | <0.10                              |                                          | <0.20                                |                                           |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 41.2                                     | 13.6                               |                                          | 42.2                                 |                                           |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 8.50                                     | 3.10                               |                                          | 9.92                                 |                                           |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                          |                                    | <0.30                                    |                                      | <0.075                                    |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                          |                                    | <0.060                                   |                                      | <0.020                                    |
|                                                                       | Acenaphthylene (mg/kg)            |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Anthracene (mg/kg)                |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Anthracene (mg/kg wwt)            |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Chrysene (mg/kg)                  |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Chrysene (mg/kg wwt)              |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Fluoranthene (mg/kg)              |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Fluorene (mg/kg)                  |                                          |                                    | <0.050                                   |                                      | <0.20                                     |
|                                                                       | Fluorene (mg/kg wwt)              |                                          |                                    | <0.010                                   |                                      | <0.040                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-32                               | L719088-35                             | L719088-36                               | L719088-38                               | L719088-40                              |
|-----------------------------------------------------------------------|-----------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|------------------------------------------|-----------------------------------------|
|                                                                       |                                   | 04-OCT-08                                | 04-OCT-08                              | 06-OCT-08                                | 06-OCT-08                                | 06-OCT-08                               |
|                                                                       |                                   | 0539137-0978302-<br>LEAVES 1<br>(METALS) | 0539137-0978302-<br>LEAVES<br>(METALS) | 0536450-<br>09878838-FRUTO<br>A (METALS) | 0536450-<br>09878838-FRUTO<br>B (METALS) | 0536450-<br>09878838-HOJA A<br>(METALS) |
| Grouping                                                              | Analyte                           |                                          |                                        |                                          |                                          |                                         |
| TISSUE                                                                |                                   |                                          |                                        |                                          |                                          |                                         |
| Metals                                                                | Selenium (Se)-Total (mg/kg wwt)   | 0.097                                    | 0.121                                  | 0.044                                    | 0.060                                    | 0.065                                   |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.060                                   | <0.030                                 | <0.030                                   | <0.030                                   | <0.030                                  |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.020                                   | <0.010                                 | <0.010                                   | <0.010                                   | <0.010                                  |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 132                                      | 62.3                                   | 30.0                                     | 32.5                                     | 222                                     |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 37.9                                     | 20.7                                   | 4.35                                     | 11.7                                     | 52.8                                    |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.060                                   | 0.395                                  | <0.090                                   | <0.030                                   | <0.030                                  |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.020                                   | 0.131                                  | <0.010                                   | <0.010                                   | <0.010                                  |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.40                                    | 0.89                                   | <0.60                                    | <0.20                                    | <0.20                                   |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.10                                    | 0.295                                  | <0.050                                   | <0.050                                   | <0.050                                  |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.020                                   | <0.010                                 | <0.030                                   | <0.010                                   | <0.010                                  |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0040                                  | 0.0021                                 | <0.0020                                  | <0.0020                                  | <0.0020                                 |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <1.0                                     | <0.50                                  | <1.5                                     | <0.50                                    | <0.50                                   |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.20                                    | <0.10                                  | <0.10                                    | <0.10                                    | <0.10                                   |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 40.1                                     | 13.4                                   | 16.0                                     | 13.7                                     | 36.7                                    |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 11.5                                     | 4.46                                   | 2.33                                     | 4.90                                     | 8.72                                    |
| Polycyclic<br>Aromatic<br>Hydrocarbons                                | Acenaphthene (mg/kg)              |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Acenaphthylene (mg/kg)            |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Anthracene (mg/kg)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Anthracene (mg/kg wwt)            |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Chrysene (mg/kg)                  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Chrysene (mg/kg wwt)              |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Fluoranthene (mg/kg)              |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Fluorene (mg/kg)                  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Fluorene (mg/kg wwt)              |                                          |                                        |                                          |                                          |                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-43                           | L719088-47                               | L719088-52                         | L719088-56                               | L719088-60                         |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|------------------------------------|
|                                                                       |                                   | 07-OCT-08                            | 07-OCT-08                                | 04-OCT-08<br>08:00                 | 04-OCT-08<br>08:00                       | 05-OCT-08                          |
|                                                                       |                                   | 0529754-0981600-<br>FRUIT 1 (METALS) | 0529754-0981600-<br>LEAVES 1<br>(METALS) | 0538538-0980036-<br>FRUTO (METALS) | 0538538-0980036-<br>LEAVES 1<br>(METALS) | 0536226-0982152-<br>FRUIT (METALS) |
| Grouping                                                              | Analyte                           |                                      |                                          |                                    |                                          |                                    |
| <b>TISSUE</b>                                                         |                                   |                                      |                                          |                                    |                                          |                                    |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.071                                | 0.025                                    | 0.068                              | 0.300                                    | 0.041                              |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                               | <0.030                                   | <0.030                             | <0.030                                   | <0.030                             |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                               | <0.010                                   | <0.010                             | <0.010                                   | <0.010                             |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 27.4                                 | 40.9                                     | 13.6                               | 56.5                                     | 7.09                               |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 6.61                                 | 8.89                                     | 6.45                               | 24.1                                     | 1.70                               |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030                               | <0.030                                   | <0.030                             | <0.030                                   | <0.030                             |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                               | <0.010                                   | <0.010                             | <0.010                                   | <0.010                             |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20                                | <0.20                                    | <0.20                              | <0.20                                    | <0.20                              |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                               | <0.050                                   | <0.050                             | <0.050                                   | <0.050                             |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010                               | <0.010                                   | <0.010                             | <0.010                                   | <0.010                             |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                              | <0.0020                                  | <0.0020                            | <0.0020                                  | <0.0020                            |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50                                | <0.50                                    | <0.50                              | <0.50                                    | <0.50                              |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                | <0.10                                    | <0.10                              | <0.10                                    | <0.10                              |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 25.0                                 | 68.3                                     | 26.2                               | 17.1                                     | 34.9                               |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 6.05                                 | 14.8                                     | 12.5                               | 7.30                                     | 8.36                               |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Acenaphthylene (mg/kg)            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Anthracene (mg/kg)                |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Anthracene (mg/kg wwt)            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Chrysene (mg/kg)                  |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Chrysene (mg/kg wwt)              |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Fluoranthene (mg/kg)              |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Fluorene (mg/kg)                  |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Fluorene (mg/kg wwt)              |                                      |                                          |                                    |                                          |                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-61                           | L719088-63                               | L719088-65                          | L719088-68                           | L719088-72                               |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                   | 05-OCT-08                            | 05-OCT-08                                | 05-OCT-08                           | 06-OCT-08                            | 06-OCT-08                                |
|                                                                       |                                   | 0536226-0982152-<br>FRUIT A (METALS) | 0536226-0982152-<br>LEAVES A<br>(METALS) | 0536226-0982152-<br>HOJA B (METALS) | 0538340-0981770-<br>FRUIT 1 (METALS) | 0538340-0981770-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                           |                                      |                                          |                                     |                                      |                                          |
| <b>TISSUE</b>                                                         |                                   |                                      |                                          |                                     |                                      |                                          |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.029                                | 0.044                                    | 0.041                               | <0.020                               | 0.044                                    |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                               | <0.030                                   | <0.030                              | <0.060                               | <0.12                                    |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                               | <0.010                                   | <0.010                              | <0.020                               | <0.040                                   |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 85.5                                 | 35.0                                     | 25.0                                | 387                                  | 296                                      |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 9.48                                 | 5.58                                     | 7.23                                | 56.6                                 | 62.7                                     |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.12                                | <0.030                                   | <0.030                              | <0.060                               | <0.12                                    |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                               | <0.010                                   | <0.010                              | <0.020                               | <0.040                                   |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.80                                | <0.20                                    | <0.20                               | <0.40                                | <0.80                                    |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                               | <0.050                                   | <0.050                              | <0.10                                | <0.20                                    |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.040                               | <0.010                                   | <0.010                              | <0.020                               | <0.040                                   |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                              | <0.0020                                  | <0.0020                             | <0.0040                              | <0.0080                                  |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <2.0                                 | <0.50                                    | <0.50                               | <1.0                                 | <2.0                                     |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                | <0.10                                    | <0.10                               | <0.20                                | <0.40                                    |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 79.5                                 | 22.0                                     | 15.7                                | 38.1                                 | 21.1                                     |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 8.81                                 | 3.51                                     | 4.56                                | 5.58                                 | 4.46                                     |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)              |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Acenaphthylene (mg/kg)            |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Anthracene (mg/kg)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Anthracene (mg/kg wwt)            |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Chrysene (mg/kg)                  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Chrysene (mg/kg wwt)              |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Fluoranthene (mg/kg)              |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Fluorene (mg/kg)                  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Fluorene (mg/kg wwt)              |                                      |                                          |                                     |                                      |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L719088-76<br><br>05-OCT-08<br><br>0533588-09996774-FRUIT 1 (METALS) | L719088-80<br><br>05-OCT-08<br><br>0533588-09996774-LEAVES 1 (METALS) |  |  |
|-----------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------|--|--|
| Grouping                                                              | Analyte                           |                                                                      |                                                                       |  |  |
| <b>TISSUE</b>                                                         |                                   |                                                                      |                                                                       |  |  |
| <b>Metals</b>                                                         | Selenium (Se)-Total (mg/kg wwt)   | 0.060                                                                | 0.045                                                                 |  |  |
|                                                                       | Silver (Ag)-Total (mg/kg)         | <0.030                                                               | <0.060                                                                |  |  |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)     | <0.010                                                               | <0.020                                                                |  |  |
|                                                                       | Strontium (Sr)-Total (mg/kg)      | 128                                                                  | 121                                                                   |  |  |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt)  | 28.6                                                                 | 34.2                                                                  |  |  |
|                                                                       | Thallium (Tl)-Total (mg/kg)       | <0.030                                                               | <0.060                                                                |  |  |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)   | <0.010                                                               | <0.020                                                                |  |  |
|                                                                       | Tin (Sn)-Total (mg/kg)            | <0.20                                                                | <0.40                                                                 |  |  |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)        | <0.050                                                               | <0.10                                                                 |  |  |
|                                                                       | Uranium (U)-Total (mg/kg)         | <0.010                                                               | <0.020                                                                |  |  |
|                                                                       | Uranium (U)-Total (mg/kg wwt)     | <0.0020                                                              | <0.0040                                                               |  |  |
|                                                                       | Vanadium (V)-Total (mg/kg)        | <0.50                                                                | <1.0                                                                  |  |  |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)    | <0.10                                                                | <0.20                                                                 |  |  |
|                                                                       | Zinc (Zn)-Total (mg/kg)           | 40.6                                                                 | 43.0                                                                  |  |  |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)       | 9.07                                                                 | 12.1                                                                  |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Acenaphthene (mg/kg)              |                                                                      |                                                                       |  |  |
|                                                                       | Acenaphthene (mg/kg wwt)          |                                                                      |                                                                       |  |  |
|                                                                       | Acenaphthylene (mg/kg)            |                                                                      |                                                                       |  |  |
|                                                                       | Acenaphthylene (mg/kg wwt)        |                                                                      |                                                                       |  |  |
|                                                                       | Anthracene (mg/kg)                |                                                                      |                                                                       |  |  |
|                                                                       | Anthracene (mg/kg wwt)            |                                                                      |                                                                       |  |  |
|                                                                       | Benz(a)anthracene (mg/kg)         |                                                                      |                                                                       |  |  |
|                                                                       | Benz(a)anthracene (mg/kg wwt)     |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(a)pyrene (mg/kg)            |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(a)pyrene (mg/kg wwt)        |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg)      |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(b)fluoranthene (mg/kg wwt)  |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg)      |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(g,h,i)perylene (mg/kg wwt)  |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg)      |                                                                      |                                                                       |  |  |
|                                                                       | Benzo(k)fluoranthene (mg/kg wwt)  |                                                                      |                                                                       |  |  |
|                                                                       | Chrysene (mg/kg)                  |                                                                      |                                                                       |  |  |
|                                                                       | Chrysene (mg/kg wwt)              |                                                                      |                                                                       |  |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)     |                                                                      |                                                                       |  |  |
|                                                                       | Dibenz(a,h)anthracene (mg/kg wwt) |                                                                      |                                                                       |  |  |
|                                                                       | Fluoranthene (mg/kg)              |                                                                      |                                                                       |  |  |
|                                                                       | Fluoranthene (mg/kg wwt)          |                                                                      |                                                                       |  |  |
|                                                                       | Fluorene (mg/kg)                  |                                                                      |                                                                       |  |  |
|                                                                       | Fluorene (mg/kg wwt)              |                                                                      |                                                                       |  |  |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L719088-2                                    | L719088-6                                | L719088-10                                         | L719088-11                             | L719088-12                              |
|-----------------------------------------------------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------|----------------------------------------------------|----------------------------------------|-----------------------------------------|
|                                                                       |                                             | 04-OCT-08<br>11:00<br>0536584-0976500-LEAVES | 04-OCT-08<br><br>0536584-0976500-FRUTO 1 | 06-OCT-08<br><br>0536470-0978834-HOJAS B (ORGANIC) | <br><br>0534485-0976630-FRUIT (METALS) | <br><br>0534485-0976630-FRUTO (ORGANIC) |
| Grouping                                                              | Analyte                                     |                                              |                                          |                                                    |                                        |                                         |
| <b>TISSUE</b>                                                         |                                             |                                              |                                          |                                                    |                                        |                                         |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | Naphthalene (mg/kg)                         |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | Phenanthrene (mg/kg)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | Pyrene (mg/kg)                              |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Pyrene (mg/kg wwt)                          |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                              |                                          |                                                    |                                        | 107                                     |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                              |                                          |                                                    |                                        | 106                                     |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                              |                                          |                                                    |                                        | 106                                     |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                              |                                          |                                                    |                                        | 106                                     |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1221 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1232 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1242 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1248 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1254 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1260 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1262 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | PCB-1268 (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                              |                                          |                                                    |                                        | <0.25                                   |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                              |                                          |                                                    |                                        | <0.050                                  |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                              |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | Aldrin (mg/kg wwt)                          |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | alpha-BHC (mg/kg)                           |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                              |                                          |                                                    |                                        | <0.010                                  |
|                                                                       | beta-BHC (mg/kg)                            |                                              |                                          |                                                    |                                        | <0.050                                  |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                              |                                          |                                                    |                                        | <0.010                                  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L719088-13                               | L719088-15                              | L719088-17                               | L719088-19                           | L719088-22                               |
|-----------------------------------------------------------------------|---------------------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                             | 0534485-0976630-<br>LEAVES 1<br>(METALS) | 0534485-0976630-<br>LEAVES<br>(ORGANIC) | 0536353-0987255-<br>FRUITS A<br>(METALS) | 0536353-0987255-<br>FRUIT B (METALS) | 0536353-0987255-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                                     |                                          |                                         |                                          |                                      |                                          |
| <b>TISSUE</b>                                                         |                                             |                                          |                                         |                                          |                                      |                                          |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Naphthalene (mg/kg)                         |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Phenanthrene (mg/kg)                        |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Pyrene (mg/kg)                              |                                          | <0.075                                  |                                          |                                      |                                          |
|                                                                       | Pyrene (mg/kg wwt)                          |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                          | 95                                      |                                          |                                      |                                          |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                          | 90                                      |                                          |                                      |                                          |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                          | 94                                      |                                          |                                      |                                          |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                          | 92                                      |                                          |                                      |                                          |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1221 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1232 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1242 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1248 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1254 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1260 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1262 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | PCB-1268 (mg/kg)                            |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                          | <0.25                                   |                                          |                                      |                                          |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                          | <0.050                                  |                                          |                                      |                                          |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Aldrin (mg/kg wwt)                          |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | alpha-BHC (mg/kg)                           |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | beta-BHC (mg/kg)                            |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                          | <0.010                                  |                                          |                                      |                                          |

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| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L719088-25                               | L719088-26                         | L719088-27                               | L719088-28                           | L719088-31                                |
|-----------------------------------------------------------------------|---------------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|--------------------------------------|-------------------------------------------|
|                                                                       |                                             | 0536353-0987255-<br>LEAVES B<br>(METALS) | 0539137-0978302-<br>FRUIT (METALS) | 0539137-0978302-<br>FRUTO 1<br>(ORGANIC) | 0539137-0978302-<br>FRUIT 1 (METALS) | 0539137-0978302-<br>LEAVES 1<br>(ORGANIC) |
| Grouping                                                              | Analyte                                     |                                          |                                    |                                          |                                      |                                           |
| <b>TISSUE</b>                                                         |                                             |                                          |                                    |                                          |                                      |                                           |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Naphthalene (mg/kg)                         |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Phenanthrene (mg/kg)                        |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Pyrene (mg/kg)                              |                                          |                                    | <0.050                                   |                                      | <0.075                                    |
|                                                                       | Pyrene (mg/kg wwt)                          |                                          |                                    | <0.010                                   |                                      | <0.020                                    |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                          |                                    | 92                                       |                                      | 92                                        |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                          |                                    | 89                                       |                                      | 85                                        |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                          |                                    | 94                                       |                                      | 89                                        |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                          |                                    | 95                                       |                                      | 91                                        |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1221 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1232 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1242 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1248 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1254 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1260 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1262 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | PCB-1268 (mg/kg)                            |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                          |                                    | <0.25                                    |                                      | <0.25                                     |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Aldrin (mg/kg wwt)                          |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | alpha-BHC (mg/kg)                           |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | beta-BHC (mg/kg)                            |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                          |                                    | <0.010                                   |                                      | <0.010                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                                 |                                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L719088-32<br><br>04-OCT-08<br><br>0539137-0978302-<br>LEAVES 1<br>(METALS) | L719088-35<br><br>04-OCT-08<br><br>0539137-0978302-<br>LEAVES<br>(METALS) | L719088-36<br><br>06-OCT-08<br><br>0536450-<br>09878838-FRUTO<br>A (METALS) | L719088-38<br><br>06-OCT-08<br><br>0536450-<br>09878838-FRUTO<br>B (METALS) | L719088-40<br><br>06-OCT-08<br><br>0536450-<br>09878838-HOJA A<br>(METALS) |
|-------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Grouping                                        | Analyte                                     |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
| <b>TISSUE</b>                                   |                                             |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b> | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Naphthalene (mg/kg)                         |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Naphthalene (mg/kg wwt)                     |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Phenanthrene (mg/kg)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Phenanthrene (mg/kg wwt)                    |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Pyrene (mg/kg)                              |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Pyrene (mg/kg wwt)                          |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Surrogate: d10-Acenaphthene (SS) (%)        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Surrogate: d12-Chrysene (SS) (%)            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Surrogate: d8-Naphthalene (SS) (%)          |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Surrogate: d10-Phenanthrene (SS) (%)        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
| <b>Polychlorinated<br/>Biphenyls</b>            | PCB-1016 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1016 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1221 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1221 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1232 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1232 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1242 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1242 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1248 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1248 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1254 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1254 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1260 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1260 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1262 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1262 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1268 (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | PCB-1268 (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Total Polychlorinated Biphenyls (mg/kg)     |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Total Polychlorinated Biphenyls (mg/kg wwt) |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
| <b>Organochlorine<br/>Pesticides</b>            | Aldrin (mg/kg)                              |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | Aldrin (mg/kg wwt)                          |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | alpha-BHC (mg/kg)                           |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | alpha-BHC (mg/kg wwt)                       |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | beta-BHC (mg/kg)                            |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |
|                                                 | beta-BHC (mg/kg wwt)                        |                                                                       |                                                                             |                                                                           |                                                                             |                                                                             |                                                                            |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L719088-43                           | L719088-47                               | L719088-52                         | L719088-56                               | L719088-60                         |
|-----------------------------------------------------------------------|---------------------------------------------|--------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|------------------------------------|
|                                                                       |                                             | 07-OCT-08                            | 07-OCT-08                                | 04-OCT-08<br>08:00                 | 04-OCT-08<br>08:00                       | 05-OCT-08                          |
|                                                                       |                                             | 0529754-0981600-<br>FRUIT 1 (METALS) | 0529754-0981600-<br>LEAVES 1<br>(METALS) | 0538538-0980036-<br>FRUTO (METALS) | 0538538-0980036-<br>LEAVES 1<br>(METALS) | 0536226-0982152-<br>FRUIT (METALS) |
| Grouping                                                              | Analyte                                     |                                      |                                          |                                    |                                          |                                    |
| <b>TISSUE</b>                                                         |                                             |                                      |                                          |                                    |                                          |                                    |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Naphthalene (mg/kg)                         |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Phenanthrene (mg/kg)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Pyrene (mg/kg)                              |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Pyrene (mg/kg wwt)                          |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                      |                                          |                                    |                                          |                                    |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1221 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1232 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1242 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1248 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1254 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1260 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1262 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1268 (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                      |                                          |                                    |                                          |                                    |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                              |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Aldrin (mg/kg wwt)                          |                                      |                                          |                                    |                                          |                                    |
|                                                                       | alpha-BHC (mg/kg)                           |                                      |                                          |                                    |                                          |                                    |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                      |                                          |                                    |                                          |                                    |
|                                                                       | beta-BHC (mg/kg)                            |                                      |                                          |                                    |                                          |                                    |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                      |                                          |                                    |                                          |                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                             | L719088-61                       | L719088-63                        | L719088-65                      | L719088-68                       | L719088-72                        |
|-----------------------------------------------------------------------|---------------------------------------------|----------------------------------|-----------------------------------|---------------------------------|----------------------------------|-----------------------------------|
|                                                                       |                                             | 05-OCT-08                        | 05-OCT-08                         | 05-OCT-08                       | 06-OCT-08                        | 06-OCT-08                         |
|                                                                       |                                             | 0536226-0982152-FRUIT A (METALS) | 0536226-0982152-LEAVES A (METALS) | 0536226-0982152-HOJA B (METALS) | 0538340-0981770-FRUIT 1 (METALS) | 0538340-0981770-LEAVES 1 (METALS) |
| Grouping                                                              | Analyte                                     |                                  |                                   |                                 |                                  |                                   |
| <b>TISSUE</b>                                                         |                                             |                                  |                                   |                                 |                                  |                                   |
| <b>Polycyclic Aromatic Hydrocarbons</b>                               | Indeno(1,2,3-c,d)pyrene (mg/kg)             |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Naphthalene (mg/kg)                         |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Naphthalene (mg/kg wwt)                     |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Phenanthrene (mg/kg)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Phenanthrene (mg/kg wwt)                    |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Pyrene (mg/kg)                              |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Pyrene (mg/kg wwt)                          |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)          |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)        |                                  |                                   |                                 |                                  |                                   |
| <b>Polychlorinated Biphenyls</b>                                      | PCB-1016 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1016 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1221 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1221 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1232 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1232 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1242 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1242 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1248 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1248 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1254 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1254 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1260 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1260 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1262 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1262 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1268 (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | PCB-1268 (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg)     |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg wwt) |                                  |                                   |                                 |                                  |                                   |
| <b>Organochlorine Pesticides</b>                                      | Aldrin (mg/kg)                              |                                  |                                   |                                 |                                  |                                   |
|                                                                       | Aldrin (mg/kg wwt)                          |                                  |                                   |                                 |                                  |                                   |
|                                                                       | alpha-BHC (mg/kg)                           |                                  |                                   |                                 |                                  |                                   |
|                                                                       | alpha-BHC (mg/kg wwt)                       |                                  |                                   |                                 |                                  |                                   |
|                                                                       | beta-BHC (mg/kg)                            |                                  |                                   |                                 |                                  |                                   |
|                                                                       | beta-BHC (mg/kg wwt)                        |                                  |                                   |                                 |                                  |                                   |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                             | Sample ID    |  |  |  |  |
|-----------------------------------------|---------------------------------------------|--------------|--|--|--|--|
|                                         |                                             | Description  |  |  |  |  |
|                                         |                                             | Sampled Date |  |  |  |  |
|                                         |                                             | Sampled Time |  |  |  |  |
|                                         |                                             | Client ID    |  |  |  |  |
| Grouping                                | Analyte                                     |              |  |  |  |  |
| <b>TISSUE</b>                           |                                             |              |  |  |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Indeno(1,2,3-c,d)pyrene (mg/kg)             |              |  |  |  |  |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg wwt)         |              |  |  |  |  |
|                                         | Naphthalene (mg/kg)                         |              |  |  |  |  |
|                                         | Naphthalene (mg/kg wwt)                     |              |  |  |  |  |
|                                         | Phenanthrene (mg/kg)                        |              |  |  |  |  |
|                                         | Phenanthrene (mg/kg wwt)                    |              |  |  |  |  |
|                                         | Pyrene (mg/kg)                              |              |  |  |  |  |
|                                         | Pyrene (mg/kg wwt)                          |              |  |  |  |  |
|                                         | Surrogate: d10-Acenaphthene (SS) (%)        |              |  |  |  |  |
|                                         | Surrogate: d12-Chrysene (SS) (%)            |              |  |  |  |  |
|                                         | Surrogate: d8-Naphthalene (SS) (%)          |              |  |  |  |  |
|                                         | Surrogate: d10-Phenanthrene (SS) (%)        |              |  |  |  |  |
| <b>Polychlorinated Biphenyls</b>        | PCB-1016 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1016 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1221 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1221 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1232 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1232 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1242 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1242 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1248 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1248 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1254 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1254 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1260 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1260 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1262 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1262 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | PCB-1268 (mg/kg)                            |              |  |  |  |  |
|                                         | PCB-1268 (mg/kg wwt)                        |              |  |  |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg)     |              |  |  |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg wwt) |              |  |  |  |  |
| <b>Organochlorine Pesticides</b>        | Aldrin (mg/kg)                              |              |  |  |  |  |
|                                         | Aldrin (mg/kg wwt)                          |              |  |  |  |  |
|                                         | alpha-BHC (mg/kg)                           |              |  |  |  |  |
|                                         | alpha-BHC (mg/kg wwt)                       |              |  |  |  |  |
|                                         | beta-BHC (mg/kg)                            |              |  |  |  |  |
|                                         | beta-BHC (mg/kg wwt)                        |              |  |  |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L719088-2                                        | L719088-6                                    | L719088-10                                                | L719088-11                                 | L719088-12                                     |
|-----------------------------------------------------------------------|-------------------------------------|--------------------------------------------------|----------------------------------------------|-----------------------------------------------------------|--------------------------------------------|------------------------------------------------|
|                                                                       |                                     | 04-OCT-08<br>11:00<br>0536584-0976500-<br>LEAVES | 04-OCT-08<br><br>0536584-0976500-<br>FRUTO 1 | 06-OCT-08<br><br>0536470-0978834-<br>HOJAS B<br>(ORGANIC) | <br><br>0534485-0976630-<br>FRUIT (METALS) | <br><br>0534485-0976630-<br>FRUTO<br>(ORGANIC) |
| Grouping                                                              | Analyte                             |                                                  |                                              |                                                           |                                            |                                                |
| <b>TISSUE</b>                                                         |                                     |                                                  |                                              |                                                           |                                            |                                                |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | delta-BHC (mg/kg)                   |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | delta-BHC (mg/kg wwt)               |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | Dieldrin (mg/kg)                    |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Dieldrin (mg/kg wwt)                |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Endosulfan I (mg/kg)                |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Endosulfan II (mg/kg)               |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Endrin (mg/kg)                      |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Endrin (mg/kg wwt)                  |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Heptachlor (mg/kg)                  |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | Heptachlor (mg/kg wwt)              |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | Methoxychlor (mg/kg)                |                                                  |                                              |                                                           |                                            | <0.15                                          |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                                  |                                              |                                                           |                                            | <0.020                                         |
|                                                                       | Mirex (mg/kg)                       |                                                  |                                              |                                                           |                                            | <0.050                                         |
|                                                                       | Mirex (mg/kg wwt)                   |                                                  |                                              |                                                           |                                            | <0.010                                         |
|                                                                       | cis-Nonachlor (mg/kg)               |                                                  |                                              |                                                           |                                            | <0.050                                         |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L719088-13                               | L719088-15                              | L719088-17                               | L719088-19                           | L719088-22                               |
|-----------------------------------------------------------------------|-------------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                     | 0534485-0976630-<br>LEAVES 1<br>(METALS) | 0534485-0976630-<br>LEAVES<br>(ORGANIC) | 0536353-0987255-<br>FRUITS A<br>(METALS) | 0536353-0987255-<br>FRUIT B (METALS) | 0536353-0987255-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                             |                                          |                                         |                                          |                                      |                                          |
| <b>TISSUE</b>                                                         |                                     |                                          |                                         |                                          |                                      |                                          |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | delta-BHC (mg/kg)                   |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | delta-BHC (mg/kg wwt)               |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | Dieldrin (mg/kg)                    |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Dieldrin (mg/kg wwt)                |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan I (mg/kg)                |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan II (mg/kg)               |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Endrin (mg/kg)                      |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Endrin (mg/kg wwt)                  |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Heptachlor (mg/kg)                  |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Heptachlor (mg/kg wwt)              |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | Methoxychlor (mg/kg)                |                                          | <0.060                                  |                                          |                                      |                                          |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                          | <0.020                                  |                                          |                                      |                                          |
|                                                                       | Mirex (mg/kg)                       |                                          | <0.050                                  |                                          |                                      |                                          |
|                                                                       | Mirex (mg/kg wwt)                   |                                          | <0.010                                  |                                          |                                      |                                          |
|                                                                       | cis-Nonachlor (mg/kg)               |                                          | <0.050                                  |                                          |                                      |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L719088-25                               | L719088-26                         | L719088-27                               | L719088-28                           | L719088-31                                |
|-----------------------------------------------------------------------|-------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|--------------------------------------|-------------------------------------------|
|                                                                       |                                     | 0536353-0987255-<br>LEAVES B<br>(METALS) | 0539137-0978302-<br>FRUIT (METALS) | 0539137-0978302-<br>FRUTO 1<br>(ORGANIC) | 0539137-0978302-<br>FRUIT 1 (METALS) | 0539137-0978302-<br>LEAVES 1<br>(ORGANIC) |
| Grouping                                                              | Analyte                             |                                          |                                    |                                          |                                      |                                           |
| <b>TISSUE</b>                                                         |                                     |                                          |                                    |                                          |                                      |                                           |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | delta-BHC (mg/kg)                   |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | delta-BHC (mg/kg wwt)               |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | Dieldrin (mg/kg)                    |                                          |                                    | <0.090                                   |                                      | <0.070                                    |
|                                                                       | Dieldrin (mg/kg wwt)                |                                          |                                    | <0.020                                   |                                      | <0.020                                    |
|                                                                       | Endosulfan I (mg/kg)                |                                          |                                    | <0.090                                   |                                      | <0.070                                    |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                          |                                    | <0.020                                   |                                      | <0.020                                    |
|                                                                       | Endosulfan II (mg/kg)               |                                          |                                    | <0.090                                   |                                      | <0.070                                    |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                          |                                    | <0.020                                   |                                      | <0.020                                    |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                          |                                    | <0.090                                   |                                      | <0.070                                    |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                          |                                    | <0.020                                   |                                      | <0.020                                    |
|                                                                       | Endrin (mg/kg)                      |                                          |                                    | <0.090                                   |                                      | <0.070                                    |
|                                                                       | Endrin (mg/kg wwt)                  |                                          |                                    | <0.020                                   |                                      | <0.020                                    |
|                                                                       | Heptachlor (mg/kg)                  |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Heptachlor (mg/kg wwt)              |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | Methoxychlor (mg/kg)                |                                          |                                    | <0.090                                   |                                      | <0.70                                     |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                          |                                    | <0.020                                   |                                      | <0.20                                     |
|                                                                       | Mirex (mg/kg)                       |                                          |                                    | <0.050                                   |                                      | <0.050                                    |
|                                                                       | Mirex (mg/kg wwt)                   |                                          |                                    | <0.010                                   |                                      | <0.010                                    |
|                                                                       | cis-Nonachlor (mg/kg)               |                                          |                                    | <0.050                                   |                                      | <0.050                                    |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L719088-32                               | L719088-35                             | L719088-36                               | L719088-38                               | L719088-40                              |
|-----------------------------------------------------------------------|-------------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|------------------------------------------|-----------------------------------------|
| Grouping Analyte                                                      |                                     | 0539137-0978302-<br>LEAVES 1<br>(METALS) | 0539137-0978302-<br>LEAVES<br>(METALS) | 0536450-<br>09878838-FRUTO<br>A (METALS) | 0536450-<br>09878838-FRUTO<br>B (METALS) | 0536450-<br>09878838-HOJA A<br>(METALS) |
| TISSUE                                                                |                                     |                                          |                                        |                                          |                                          |                                         |
| Organochlorine<br>Pesticides                                          | Lindane (gamma - BHC) (mg/kg)       |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                          |                                        |                                          |                                          |                                         |
|                                                                       | delta-BHC (mg/kg)                   |                                          |                                        |                                          |                                          |                                         |
|                                                                       | delta-BHC (mg/kg wwt)               |                                          |                                        |                                          |                                          |                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                          |                                        |                                          |                                          |                                         |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                          |                                        |                                          |                                          |                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                          |                                        |                                          |                                          |                                         |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Dieldrin (mg/kg)                    |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Dieldrin (mg/kg wwt)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan I (mg/kg)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan II (mg/kg)               |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endrin (mg/kg)                      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Endrin (mg/kg wwt)                  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Heptachlor (mg/kg)                  |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Heptachlor (mg/kg wwt)              |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Methoxychlor (mg/kg)                |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Mirex (mg/kg)                       |                                          |                                        |                                          |                                          |                                         |
|                                                                       | Mirex (mg/kg wwt)                   |                                          |                                        |                                          |                                          |                                         |
|                                                                       | cis-Nonachlor (mg/kg)               |                                          |                                        |                                          |                                          |                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L719088-43<br><br>07-OCT-08<br><br>0529754-0981600-<br>FRUIT 1 (METALS) | L719088-47<br><br>07-OCT-08<br><br>0529754-0981600-<br>LEAVES 1<br>(METALS) | L719088-52<br><br>04-OCT-08<br>08:00<br>0538538-0980036-<br>FRUTO (METALS) | L719088-56<br><br>04-OCT-08<br>08:00<br>0538538-0980036-<br>LEAVES 1<br>(METALS) | L719088-60<br><br>05-OCT-08<br><br>0536226-0982152-<br>FRUIT (METALS) |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Grouping                             | Analyte                             |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |
|                                      | cis-Nonachlor (mg/kg)               |                                                                       |                                                                         |                                                                             |                                                                            |                                                                                  |                                                                       |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                     | L719088-61                           | L719088-63                               | L719088-65                          | L719088-68                           | L719088-72                               |
|-----------------------------------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------------|
|                                                                       |                                     | 05-OCT-08                            | 05-OCT-08                                | 05-OCT-08                           | 06-OCT-08                            | 06-OCT-08                                |
|                                                                       |                                     | 0536226-0982152-<br>FRUIT A (METALS) | 0536226-0982152-<br>LEAVES A<br>(METALS) | 0536226-0982152-<br>HOJA B (METALS) | 0538340-0981770-<br>FRUIT 1 (METALS) | 0538340-0981770-<br>LEAVES 1<br>(METALS) |
| Grouping                                                              | Analyte                             |                                      |                                          |                                     |                                      |                                          |
| <b>TISSUE</b>                                                         |                                     |                                      |                                          |                                     |                                      |                                          |
| <b>Organochlorine<br/>Pesticides</b>                                  | Lindane (gamma - BHC) (mg/kg)       |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Lindane (gamma - BHC) (mg/kg wwt)   |                                      |                                          |                                     |                                      |                                          |
|                                                                       | delta-BHC (mg/kg)                   |                                      |                                          |                                     |                                      |                                          |
|                                                                       | delta-BHC (mg/kg wwt)               |                                      |                                          |                                     |                                      |                                          |
|                                                                       | cis-Chlordane (alpha) (mg/kg)       |                                      |                                          |                                     |                                      |                                          |
|                                                                       | cis-Chlordane (alpha) (mg/kg wwt)   |                                      |                                          |                                     |                                      |                                          |
|                                                                       | trans-Chlordane (gamma) (mg/kg)     |                                      |                                          |                                     |                                      |                                          |
|                                                                       | trans-Chlordane (gamma) (mg/kg wwt) |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDD (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDD (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDD (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDD (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDE (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDE (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDE (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDE (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDT (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 2,4'-DDT (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDT (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | 4,4'-DDT (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Dieldrin (mg/kg)                    |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Dieldrin (mg/kg wwt)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan I (mg/kg)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan I (mg/kg wwt)            |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan II (mg/kg)               |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan II (mg/kg wwt)           |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan Sulfate (mg/kg)          |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endosulfan Sulfate (mg/kg wwt)      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endrin (mg/kg)                      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Endrin (mg/kg wwt)                  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Heptachlor (mg/kg)                  |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Heptachlor (mg/kg wwt)              |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Heptachlor Epoxide (mg/kg)          |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Heptachlor Epoxide (mg/kg wwt)      |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Methoxychlor (mg/kg)                |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Methoxychlor (mg/kg wwt)            |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Mirex (mg/kg)                       |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Mirex (mg/kg wwt)                   |                                      |                                          |                                     |                                      |                                          |
|                                                                       | cis-Nonachlor (mg/kg)               |                                      |                                          |                                     |                                      |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                                     | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L719088-76<br><br>05-OCT-08<br><br>0533588-<br>09996774-FRUIT 1<br>(METALS) | L719088-80<br><br>05-OCT-08<br><br>0533588-<br>09996774-LEAVES<br>1 (METALS) |  |  |  |
|--------------------------------------|-------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|--|--|--|
| Grouping                             | Analyte                             |                                                                       |                                                                             |                                                                              |  |  |  |
| <b>TISSUE</b>                        |                                     |                                                                       |                                                                             |                                                                              |  |  |  |
| <b>Organochlorine<br/>Pesticides</b> | Lindane (gamma - BHC) (mg/kg)       |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Lindane (gamma - BHC) (mg/kg wwt)   |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | delta-BHC (mg/kg)                   |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | delta-BHC (mg/kg wwt)               |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | cis-Chlordane (alpha) (mg/kg)       |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | cis-Chlordane (alpha) (mg/kg wwt)   |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | trans-Chlordane (gamma) (mg/kg)     |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | trans-Chlordane (gamma) (mg/kg wwt) |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDD (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDD (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDD (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDD (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDE (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDE (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDE (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDE (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDT (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 2,4'-DDT (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDT (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | 4,4'-DDT (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Dieldrin (mg/kg)                    |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Dieldrin (mg/kg wwt)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan I (mg/kg)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan I (mg/kg wwt)            |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan II (mg/kg)               |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan II (mg/kg wwt)           |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan Sulfate (mg/kg)          |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endosulfan Sulfate (mg/kg wwt)      |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endrin (mg/kg)                      |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Endrin (mg/kg wwt)                  |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Heptachlor (mg/kg)                  |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Heptachlor (mg/kg wwt)              |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Heptachlor Epoxide (mg/kg)          |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Heptachlor Epoxide (mg/kg wwt)      |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Methoxychlor (mg/kg)                |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Methoxychlor (mg/kg wwt)            |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Mirex (mg/kg)                       |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | Mirex (mg/kg wwt)                   |                                                                       |                                                                             |                                                                              |  |  |  |
|                                      | cis-Nonachlor (mg/kg)               |                                                                       |                                                                             |                                                                              |  |  |  |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-2                                        | L719088-6                                    | L719088-10                                                | L719088-11                         | L719088-12                             |
|-----------------------------------------------------------------------|-----------------------------|--------------------------------------------------|----------------------------------------------|-----------------------------------------------------------|------------------------------------|----------------------------------------|
| Grouping                                                              | Analyte                     | 04-OCT-08<br>11:00<br>0536584-0976500-<br>LEAVES | 04-OCT-08<br><br>0536584-0976500-<br>FRUTO 1 | 06-OCT-08<br><br>0536470-0978834-<br>HOJAS B<br>(ORGANIC) | 0534485-0976630-<br>FRUIT (METALS) | 0534485-0976630-<br>FRUTO<br>(ORGANIC) |
| TISSUE                                                                |                             |                                                  |                                              |                                                           |                                    |                                        |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | trans-Nonachlor (mg/kg)     |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                                  |                                              |                                                           |                                    | <0.010                                 |
|                                                                       | Oxychlordane (mg/kg)        |                                                  |                                              |                                                           |                                    | <0.050                                 |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                                  |                                              |                                                           |                                    | <0.010                                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-13                       | L719088-15                       | L719088-17                       | L719088-19                        | L719088-22 |
|-----------------------------------------------------------------------|-----------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|------------|
| 0534485-0976630-LEAVES 1 (METALS)                                     |                             | 0534485-0976630-LEAVES (ORGANIC) | 0536353-0987255-FRUIT A (METALS) | 0536353-0987255-FRUIT B (METALS) | 0536353-0987255-LEAVES 1 (METALS) |            |
| Grouping                                                              | Analyte                     |                                  |                                  |                                  |                                   |            |
| TISSUE                                                                |                             |                                  |                                  |                                  |                                   |            |
| Organochlorine Pesticides                                             | cis-Nonachlor (mg/kg wwt)   |                                  | <0.010                           |                                  |                                   |            |
|                                                                       | trans-Nonachlor (mg/kg)     |                                  | <0.050                           |                                  |                                   |            |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                  | <0.010                           |                                  |                                   |            |
|                                                                       | Oxychlordane (mg/kg)        |                                  | <0.050                           |                                  |                                   |            |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                  | <0.010                           |                                  |                                   |            |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-25                         | L719088-26                               | L719088-27                           | L719088-28                                | L719088-31 |
|-----------------------------------------------------------------------|-----------------------------|------------------------------------|------------------------------------------|--------------------------------------|-------------------------------------------|------------|
| 0536353-0987255-<br>LEAVES B<br>(METALS)                              |                             | 0539137-0978302-<br>FRUIT (METALS) | 0539137-0978302-<br>FRUTO 1<br>(ORGANIC) | 0539137-0978302-<br>FRUIT 1 (METALS) | 0539137-0978302-<br>LEAVES 1<br>(ORGANIC) |            |
| Grouping                                                              | Analyte                     |                                    |                                          |                                      |                                           |            |
| TISSUE                                                                |                             |                                    |                                          |                                      |                                           |            |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                    |                                          | <0.010                               |                                           | <0.010     |
|                                                                       | trans-Nonachlor (mg/kg)     |                                    |                                          | <0.050                               |                                           | <0.050     |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                    |                                          | <0.010                               |                                           | <0.010     |
|                                                                       | Oxychlordane (mg/kg)        |                                    |                                          | <0.050                               |                                           | <0.050     |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                    |                                          | <0.010                               |                                           | <0.010     |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-32                        | L719088-35                      | L719088-36                        | L719088-38                        | L719088-40                       |
|-----------------------------------------------------------------------|-----------------------------|-----------------------------------|---------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| Grouping                                                              | Analyte                     | 0539137-0978302-LEAVES 1 (METALS) | 0539137-0978302-LEAVES (METALS) | 0536450-09878838-FRUTO A (METALS) | 0536450-09878838-FRUTO B (METALS) | 0536450-09878838-HOJA A (METALS) |
| TISSUE                                                                |                             |                                   |                                 |                                   |                                   |                                  |
| Organochlorine Pesticides                                             | cis-Nonachlor (mg/kg wwt)   |                                   |                                 |                                   |                                   |                                  |
|                                                                       | trans-Nonachlor (mg/kg)     |                                   |                                 |                                   |                                   |                                  |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                   |                                 |                                   |                                   |                                  |
|                                                                       | Oxychlordane (mg/kg)        |                                   |                                 |                                   |                                   |                                  |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                   |                                 |                                   |                                   |                                  |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-43                           | L719088-47                               | L719088-52                         | L719088-56                               | L719088-60                         |
|-----------------------------------------------------------------------|-----------------------------|--------------------------------------|------------------------------------------|------------------------------------|------------------------------------------|------------------------------------|
| Grouping                                                              | Analyte                     | 0529754-0981600-<br>FRUIT 1 (METALS) | 0529754-0981600-<br>LEAVES 1<br>(METALS) | 0538538-0980036-<br>FRUTO (METALS) | 0538538-0980036-<br>LEAVES 1<br>(METALS) | 0536226-0982152-<br>FRUIT (METALS) |
| TISSUE                                                                |                             |                                      |                                          |                                    |                                          |                                    |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                      |                                          |                                    |                                          |                                    |
|                                                                       | trans-Nonachlor (mg/kg)     |                                      |                                          |                                    |                                          |                                    |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Oxychlordane (mg/kg)        |                                      |                                          |                                    |                                          |                                    |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                      |                                          |                                    |                                          |                                    |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                             | L719088-61                           | L719088-63                               | L719088-65                          | L719088-68                           | L719088-72                               |
|-----------------------------------------------------------------------|-----------------------------|--------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------------|
| Grouping                                                              | Analyte                     | 0536226-0982152-<br>FRUIT A (METALS) | 0536226-0982152-<br>LEAVES A<br>(METALS) | 0536226-0982152-<br>HOJA B (METALS) | 0538340-0981770-<br>FRUIT 1 (METALS) | 0538340-0981770-<br>LEAVES 1<br>(METALS) |
| TISSUE                                                                |                             |                                      |                                          |                                     |                                      |                                          |
| Organochlorine<br>Pesticides                                          | cis-Nonachlor (mg/kg wwt)   |                                      |                                          |                                     |                                      |                                          |
|                                                                       | trans-Nonachlor (mg/kg)     |                                      |                                          |                                     |                                      |                                          |
|                                                                       | trans-Nonachlor (mg/kg wwt) |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Oxychlordane (mg/kg)        |                                      |                                          |                                     |                                      |                                          |
|                                                                       | Oxychlordane (mg/kg wwt)    |                                      |                                          |                                     |                                      |                                          |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                              |                             | Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID | L719088-76<br><br>05-OCT-08<br><br>0533588-<br>09996774-FRUIT 1<br>(METALS) | L719088-80<br><br>05-OCT-08<br><br>0533588-<br>09996774-LEAVES<br>1 (METALS) |  |  |  |
|------------------------------|-----------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|--|--|--|
| Grouping                     | Analyte                     |                                                                       |                                                                             |                                                                              |  |  |  |
| TISSUE                       |                             |                                                                       |                                                                             |                                                                              |  |  |  |
| Organochlorine<br>Pesticides | cis-Nonachlor (mg/kg wwt)   |                                                                       |                                                                             |                                                                              |  |  |  |
|                              | trans-Nonachlor (mg/kg)     |                                                                       |                                                                             |                                                                              |  |  |  |
|                              | trans-Nonachlor (mg/kg wwt) |                                                                       |                                                                             |                                                                              |  |  |  |
|                              | Oxychlordane (mg/kg)        |                                                                       |                                                                             |                                                                              |  |  |  |
|                              | Oxychlordane (mg/kg wwt)    |                                                                       |                                                                             |                                                                              |  |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**AG-DRY-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**AG-WET-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-DRY-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-WET-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-DRY-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MET-WET-MS-VA** Tissue Metals in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**MOISTURE-TISS-VA** Tissue % Moisture in Tissues ASTM METHOD D2974-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Matrix | Test Description                 | Analytical Method Reference(Based On) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------------------|---------------------------------------|
| <b>OCP1-TDRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270   |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).                                   |        |                                  |                                       |
| <b>OCP1-TWET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | OCP-1 in Tissue by Soxhlet GCECD | EPA METHODS 3540, 3600, 8081 & 8270   |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, 8081 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS) and/or capillary column gas chromatography with electron capture detection (GC/ECD).                                   |        |                                  |                                       |
| <b>PAH-T-DRY-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270         |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. |        |                                  |                                       |
| <b>PAH-T-WET-SOX-MS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tissue | PAHs in Tissue by Soxhlet GCMS   | EPA METHODS 3540, 3600 & 8270         |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation. |        |                                  |                                       |
| <b>PCB-T-DRY-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082        |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).                                                                                                                              |        |                                  |                                       |
| <b>PCB-T-WET-SOX-ECD-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Tissue | PCB in Tissue by Soxhlet GCECD   | EPA METHODS 3540, 3600, & 8082        |
| This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3600, & 8082 published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane Soxhlet extraction of a subsample of the homogenized tissue which has been dried with anhydrous sodium sulphate. The extract then undergoes a reverse phase C18 clean-up to remove fats and oils. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).                                                                                                                              |        |                                  |                                       |
| <b>SE-DRY-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                 |
| This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).                                                                                                               |        |                                  |                                       |
| <b>SE-WET-HVAAS-VA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Tissue | Selenium in Tissue by HVAAS      | PUGET SOUND PROTOCOLS                 |
| This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).                                                                                                               |        |                                  |                                       |

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location | Laboratory Definition Code | Laboratory Location |
|----------------------------|---------------------|----------------------------|---------------------|
|----------------------------|---------------------|----------------------------|---------------------|

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description                                | Analytical Method Reference(Based On) |
|---------------|--------|-------------------------------------------------|---------------------------------------|
| VA            |        | ALS LABORATORY GROUP -<br>VANCOUVER, BC, CANADA |                                       |

### GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



**Environmental Division**

# ALS Laboratory Group Quality Control Report

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Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: ADRIAN DE BRUYN

| Test               | Matrix  | Reference    | Result  | Qualifier | Units     | RPD    | Limit  | Analyzed  |
|--------------------|---------|--------------|---------|-----------|-----------|--------|--------|-----------|
| HG-DRY-CVAFS-VA    |         | Tissue       |         |           |           |        |        |           |
| Batch              | R785152 |              |         |           |           |        |        |           |
| WG901915-4         | CRM     | VA-NIST-1547 |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | 115     |           | %         |        | 80-120 | 04-FEB-09 |
| WG901915-5         | CRM     | VA-NIST-1515 |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | 100     |           | %         |        | 68-114 | 04-FEB-09 |
| WG901915-3         | DUP     | L719088-43   |         |           |           |        |        |           |
| Mercury (Hg)-Total |         | <0.0050      | <0.0050 | RPD-NA    | mg/kg     | N/A    | 45     | 04-FEB-09 |
| WG902859-3         | DUP     | L719088-47   |         |           |           |        |        |           |
| Mercury (Hg)-Total |         | 0.0216       | 0.0200  | J         | mg/kg     | 0.0016 | 0.02   | 04-FEB-09 |
| WG901915-1         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0050 |           | mg/kg     |        | 0.005  | 04-FEB-09 |
| WG901915-2         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0050 |           | mg/kg     |        | 0.005  | 04-FEB-09 |
| WG902859-1         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0050 |           | mg/kg     |        | 0.005  | 04-FEB-09 |
| WG902859-2         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0050 |           | mg/kg     |        | 0.005  | 04-FEB-09 |
| HG-WET-CVAFS-VA    |         | Tissue       |         |           |           |        |        |           |
| Batch              | R785152 |              |         |           |           |        |        |           |
| WG901915-4         | CRM     | VA-NIST-1547 |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | 115     |           | %         |        | 80-120 | 04-FEB-09 |
| WG901915-5         | CRM     | VA-NIST-1515 |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | 100     |           | %         |        | 68-114 | 04-FEB-09 |
| WG901915-3         | DUP     | L719088-43   |         |           |           |        |        |           |
| Mercury (Hg)-Total |         | <0.0010      | <0.0010 | RPD-NA    | mg/kg wwt | N/A    | 45     | 04-FEB-09 |
| WG902859-3         | DUP     | L719088-47   |         |           |           |        |        |           |
| Mercury (Hg)-Total |         | 0.0047       | 0.0043  | J         | mg/kg wwt | 0.0003 | 0.004  | 04-FEB-09 |
| WG901915-1         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0010 |           | mg/kg wwt |        | 0.001  | 04-FEB-09 |
| WG901915-2         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0010 |           | mg/kg wwt |        | 0.001  | 04-FEB-09 |
| WG902859-1         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | 0.0010  |           | mg/kg wwt |        | 0.001  | 04-FEB-09 |
| WG902859-2         | MB      |              |         |           |           |        |        |           |
| Mercury (Hg)-Total |         |              | <0.0010 |           | mg/kg wwt |        | 0.001  | 04-FEB-09 |
| MET-DRY-MS-VA      |         | Tissue       |         |           |           |        |        |           |

# ALS Laboratory Group Quality Control Report

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| Test                 | Matrix         | Reference           | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|----------------------|----------------|---------------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-DRY-MS-VA</b> |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>         | <b>R784522</b> |                     |        |           |       |      |        |           |
| <b>WG901915-4</b>    | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |       |      |        |           |
| Aluminum (Al)-Total  |                |                     | 78     |           | %     |      | 69-112 | 30-JAN-09 |
| Barium (Ba)-Total    |                |                     | 87     |           | %     |      | 83-119 | 30-JAN-09 |
| Calcium (Ca)-Total   |                |                     | 98     |           | %     |      | 87-114 | 30-JAN-09 |
| Chromium (Cr)-Total  |                |                     | 87     |           | %     |      | 48-89  | 30-JAN-09 |
| Copper (Cu)-Total    |                |                     | 103    |           | %     |      | 86-115 | 30-JAN-09 |
| Lead (Pb)-Total      |                |                     | 102    |           | %     |      | 79-120 | 30-JAN-09 |
| Magnesium (Mg)-Total |                |                     | 100    |           | %     |      | 65-135 | 30-JAN-09 |
| Manganese (Mn)-Total |                |                     | 90     |           | %     |      | 86-117 | 30-JAN-09 |
| Strontium (Sr)-Total |                |                     | 97     |           | %     |      | 93-125 | 30-JAN-09 |
| Zinc (Zn)-Total      |                |                     | 102    |           | %     |      | 84-120 | 30-JAN-09 |
| <b>WG901915-5</b>    | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |       |      |        |           |
| Aluminum (Al)-Total  |                |                     | 82     |           | %     |      | 66-109 | 30-JAN-09 |
| Barium (Ba)-Total    |                |                     | 87     | RM-L      | %     |      | 90-113 | 30-JAN-09 |
| Calcium (Ca)-Total   |                |                     | 98     |           | %     |      | 87-116 | 30-JAN-09 |
| Copper (Cu)-Total    |                |                     | 102    |           | %     |      | 83-114 | 30-JAN-09 |
| Lead (Pb)-Total      |                |                     | 109    |           | %     |      | 70-117 | 30-JAN-09 |
| Magnesium (Mg)-Total |                |                     | 96     |           | %     |      | 85-115 | 30-JAN-09 |
| Manganese (Mn)-Total |                |                     | 88     | RM-L      | %     |      | 89-116 | 30-JAN-09 |
| Strontium (Sr)-Total |                |                     | 91     |           | %     |      | 89-119 | 30-JAN-09 |
| Zinc (Zn)-Total      |                |                     | 101    |           | %     |      | 84-115 | 30-JAN-09 |
| <b>WG901915-3</b>    | <b>DUP</b>     | <b>L719088-43</b>   |        |           |       |      |        |           |
| Aluminum (Al)-Total  |                | 15                  | 14     | J         | mg/kg | 1    | 40     | 30-JAN-09 |
| Antimony (Sb)-Total  |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Barium (Ba)-Total    |                | 21.7                | 20.9   |           | mg/kg | 4.0  | 45     | 30-JAN-09 |
| Beryllium (Be)-Total |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Bismuth (Bi)-Total   |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Cadmium (Cd)-Total   |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Calcium (Ca)-Total   |                | 4260                | 4010   |           | mg/kg | 6.2  | 45     | 30-JAN-09 |
| Chromium (Cr)-Total  |                | 0.73                | 0.76   | J         | mg/kg | 0.03 | 2      | 30-JAN-09 |
| Cobalt (Co)-Total    |                | 0.22                | 0.21   | J         | mg/kg | 0.01 | 0.4    | 30-JAN-09 |
| Copper (Cu)-Total    |                | 13.7                | 13.1   |           | mg/kg | 4.4  | 45     | 30-JAN-09 |
| Lead (Pb)-Total      |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Lithium (Li)-Total   |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A  | 45     | 30-JAN-09 |
| Magnesium (Mg)-Total |                | 2550                | 2470   |           | mg/kg | 3.3  | 45     | 30-JAN-09 |

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| Test                  | Matrix  | Reference  | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|-----------------------|---------|------------|--------|-----------|-------|------|-------|-----------|
| MET-DRY-MS-VA         |         | Tissue     |        |           |       |      |       |           |
| Batch                 | R784522 |            |        |           |       |      |       |           |
| WG901915-3            | DUP     | L719088-43 |        |           |       |      |       |           |
| Manganese (Mn)-Total  |         | 343        | 330    |           | mg/kg | 3.9  | 45    | 30-JAN-09 |
| Molybdenum (Mo)-Total |         | 1.36       | 1.32   |           | mg/kg | 3.3  | 45    | 30-JAN-09 |
| Nickel (Ni)-Total     |         | 0.50       | 0.71   | J         | mg/kg | 0.21 | 2     | 30-JAN-09 |
| Strontium (Sr)-Total  |         | 27.4       | 25.0   |           | mg/kg | 8.9  | 45    | 30-JAN-09 |
| Thallium (Tl)-Total   |         | <0.030     | <0.030 | RPD-NA    | mg/kg | N/A  | 45    | 30-JAN-09 |
| Tin (Sn)-Total        |         | <0.20      | 0.21   | RPD-NA    | mg/kg | N/A  | 45    | 30-JAN-09 |
| Uranium (U)-Total     |         | <0.010     | <0.010 | RPD-NA    | mg/kg | N/A  | 45    | 30-JAN-09 |
| Vanadium (V)-Total    |         | <0.50      | <0.50  | RPD-NA    | mg/kg | N/A  | 45    | 30-JAN-09 |
| Zinc (Zn)-Total       |         | 25.0       | 24.1   |           | mg/kg | 3.7  | 45    | 30-JAN-09 |
| WG901915-1            | MB      |            |        |           |       |      |       |           |
| Aluminum (Al)-Total   |         |            | <10    |           | mg/kg |      | 10    | 30-JAN-09 |
| Antimony (Sb)-Total   |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Arsenic (As)-Total    |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Barium (Ba)-Total     |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Beryllium (Be)-Total  |         |            | <0.30  |           | mg/kg |      | 0.3   | 30-JAN-09 |
| Bismuth (Bi)-Total    |         |            | <0.30  |           | mg/kg |      | 0.3   | 30-JAN-09 |
| Cadmium (Cd)-Total    |         |            | <0.030 |           | mg/kg |      | 0.03  | 30-JAN-09 |
| Calcium (Ca)-Total    |         |            | <10    |           | mg/kg |      | 10    | 30-JAN-09 |
| Chromium (Cr)-Total   |         |            | <0.50  |           | mg/kg |      | 0.5   | 30-JAN-09 |
| Cobalt (Co)-Total     |         |            | <0.10  |           | mg/kg |      | 0.1   | 30-JAN-09 |
| Copper (Cu)-Total     |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Lead (Pb)-Total       |         |            | <0.10  |           | mg/kg |      | 0.1   | 30-JAN-09 |
| Lithium (Li)-Total    |         |            | <0.50  |           | mg/kg |      | 0.5   | 30-JAN-09 |
| Magnesium (Mg)-Total  |         |            | <3.0   |           | mg/kg |      | 3     | 30-JAN-09 |
| Manganese (Mn)-Total  |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Molybdenum (Mo)-Total |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Nickel (Ni)-Total     |         |            | <0.50  |           | mg/kg |      | 0.5   | 30-JAN-09 |
| Strontium (Sr)-Total  |         |            | <0.050 |           | mg/kg |      | 0.05  | 30-JAN-09 |
| Thallium (Tl)-Total   |         |            | <0.030 |           | mg/kg |      | 0.03  | 30-JAN-09 |
| Tin (Sn)-Total        |         |            | <0.20  |           | mg/kg |      | 0.2   | 30-JAN-09 |
| Uranium (U)-Total     |         |            | <0.010 |           | mg/kg |      | 0.01  | 30-JAN-09 |
| Vanadium (V)-Total    |         |            | <0.50  |           | mg/kg |      | 0.5   | 30-JAN-09 |
| Zinc (Zn)-Total       |         |            | <0.50  |           | mg/kg |      | 0.5   | 30-JAN-09 |
| WG901915-2            | MB      |            |        |           |       |      |       |           |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R784522</b> |                     |        |           |       |     |        |           |
| <b>WG901915-2</b>     | <b>MB</b>      |                     |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |     | 10     | 30-JAN-09 |
| Antimony (Sb)-Total   |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Arsenic (As)-Total    |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Barium (Ba)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Beryllium (Be)-Total  |                |                     | <0.30  |           | mg/kg |     | 0.3    | 30-JAN-09 |
| Bismuth (Bi)-Total    |                |                     | <0.30  |           | mg/kg |     | 0.3    | 30-JAN-09 |
| Cadmium (Cd)-Total    |                |                     | <0.030 |           | mg/kg |     | 0.03   | 30-JAN-09 |
| Calcium (Ca)-Total    |                |                     | <10    |           | mg/kg |     | 10     | 30-JAN-09 |
| Chromium (Cr)-Total   |                |                     | <0.50  |           | mg/kg |     | 0.5    | 30-JAN-09 |
| Cobalt (Co)-Total     |                |                     | <0.10  |           | mg/kg |     | 0.1    | 30-JAN-09 |
| Copper (Cu)-Total     |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Lead (Pb)-Total       |                |                     | <0.10  |           | mg/kg |     | 0.1    | 30-JAN-09 |
| Lithium (Li)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 30-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | <3.0   |           | mg/kg |     | 3      | 30-JAN-09 |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg |     | 0.5    | 30-JAN-09 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 30-JAN-09 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg |     | 0.03   | 30-JAN-09 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg |     | 0.2    | 30-JAN-09 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg |     | 0.01   | 30-JAN-09 |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 30-JAN-09 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg |     | 0.5    | 30-JAN-09 |
| <b>Batch</b>          | <b>R785033</b> |                     |        |           |       |     |        |           |
| <b>WG901915-3</b>     | <b>DUP</b>     | <b>L719088-43</b>   |        |           |       |     |        |           |
| Arsenic (As)-Total    |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A | 45     | 03-FEB-09 |
| <b>Batch</b>          | <b>R785459</b> |                     |        |           |       |     |        |           |
| <b>WG902859-4</b>     | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 93     |           | %     |     | 69-112 | 04-FEB-09 |
| Barium (Ba)-Total     |                |                     | 87     |           | %     |     | 83-119 | 04-FEB-09 |
| Calcium (Ca)-Total    |                |                     | 98     |           | %     |     | 87-114 | 04-FEB-09 |
| Chromium (Cr)-Total   |                |                     | 78     |           | %     |     | 48-89  | 04-FEB-09 |
| Copper (Cu)-Total     |                |                     | 101    |           | %     |     | 86-115 | 04-FEB-09 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD   | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |       |        |           |
| <b>Batch</b>          | <b>R785459</b> |                     |        |           |       |       |        |           |
| <b>WG902859-4</b>     | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |       |       |        |           |
| Lead (Pb)-Total       |                |                     | 98     |           | %     |       | 79-120 | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |                     | 104    |           | %     |       | 65-135 | 04-FEB-09 |
| Manganese (Mn)-Total  |                |                     | 91     |           | %     |       | 86-117 | 04-FEB-09 |
| Strontium (Sr)-Total  |                |                     | 95     |           | %     |       | 93-125 | 04-FEB-09 |
| Zinc (Zn)-Total       |                |                     | 108    |           | %     |       | 84-120 | 04-FEB-09 |
| <b>WG902859-3</b>     | <b>DUP</b>     | <b>L719088-47</b>   |        |           |       |       |        |           |
| Aluminum (Al)-Total   |                | 63                  | 51     | J         | mg/kg | 11    | 40     | 04-FEB-09 |
| Antimony (Sb)-Total   |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Arsenic (As)-Total    |                | <0.050              | <0.050 | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Barium (Ba)-Total     |                | 47.0                | 48.7   |           | mg/kg | 3.7   | 45     | 04-FEB-09 |
| Beryllium (Be)-Total  |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Bismuth (Bi)-Total    |                | <0.30               | <0.30  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Cadmium (Cd)-Total    |                | 0.079               | 0.081  | J         | mg/kg | 0.002 | 0.12   | 04-FEB-09 |
| Calcium (Ca)-Total    |                | 6380                | 6330   |           | mg/kg | 0.75  | 45     | 04-FEB-09 |
| Chromium (Cr)-Total   |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Cobalt (Co)-Total     |                | 0.33                | 0.32   | J         | mg/kg | 0.01  | 0.4    | 04-FEB-09 |
| Copper (Cu)-Total     |                | 28.4                | 27.7   |           | mg/kg | 2.4   | 45     | 04-FEB-09 |
| Lead (Pb)-Total       |                | <0.10               | <0.10  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Lithium (Li)-Total    |                | 1.31                | 1.23   | J         | mg/kg | 0.08  | 2      | 04-FEB-09 |
| Magnesium (Mg)-Total  |                | 3870                | 3730   |           | mg/kg | 3.6   | 45     | 04-FEB-09 |
| Manganese (Mn)-Total  |                | 526                 | 522    |           | mg/kg | 0.88  | 45     | 04-FEB-09 |
| Molybdenum (Mo)-Total |                | 1.59                | 1.60   |           | mg/kg | 1.1   | 45     | 04-FEB-09 |
| Nickel (Ni)-Total     |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Strontium (Sr)-Total  |                | 40.9                | 41.4   |           | mg/kg | 1.2   | 45     | 04-FEB-09 |
| Thallium (Tl)-Total   |                | <0.030              | <0.030 | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Tin (Sn)-Total        |                | <0.20               | <0.20  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Uranium (U)-Total     |                | <0.010              | <0.010 | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Vanadium (V)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg | N/A   | 45     | 04-FEB-09 |
| Zinc (Zn)-Total       |                | 68.3                | 65.0   |           | mg/kg | 5.0   | 45     | 04-FEB-09 |
| <b>WG902859-1</b>     | <b>MB</b>      |                     |        |           |       |       |        |           |
| Aluminum (Al)-Total   |                |                     | <10    |           | mg/kg |       | 10     | 04-FEB-09 |
| Antimony (Sb)-Total   |                |                     | <0.050 |           | mg/kg |       | 0.05   | 04-FEB-09 |
| Arsenic (As)-Total    |                |                     | <0.050 |           | mg/kg |       | 0.05   | 04-FEB-09 |
| Barium (Ba)-Total     |                |                     | <0.050 |           | mg/kg |       | 0.05   | 04-FEB-09 |

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| Test                  | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b> |        |           |       |     |       |           |
| <b>Batch</b>          | <b>R785459</b> |               |        |           |       |     |       |           |
| <b>WG902859-1</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 04-FEB-09 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 04-FEB-09 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 04-FEB-09 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 04-FEB-09 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 04-FEB-09 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 04-FEB-09 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 04-FEB-09 |
| Manganese (Mn)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Molybdenum (Mo)-Total |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Nickel (Ni)-Total     |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Strontium (Sr)-Total  |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Thallium (Tl)-Total   |                |               | <0.030 |           | mg/kg |     | 0.03  | 04-FEB-09 |
| Tin (Sn)-Total        |                |               | <0.20  |           | mg/kg |     | 0.2   | 04-FEB-09 |
| Uranium (U)-Total     |                |               | <0.010 |           | mg/kg |     | 0.01  | 04-FEB-09 |
| Vanadium (V)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Zinc (Zn)-Total       |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| <b>WG902859-2</b>     | <b>MB</b>      |               |        |           |       |     |       |           |
| Aluminum (Al)-Total   |                |               | <10    |           | mg/kg |     | 10    | 04-FEB-09 |
| Antimony (Sb)-Total   |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Arsenic (As)-Total    |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Barium (Ba)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Beryllium (Be)-Total  |                |               | <0.30  |           | mg/kg |     | 0.3   | 04-FEB-09 |
| Bismuth (Bi)-Total    |                |               | <0.30  |           | mg/kg |     | 0.3   | 04-FEB-09 |
| Cadmium (Cd)-Total    |                |               | <0.030 |           | mg/kg |     | 0.03  | 04-FEB-09 |
| Calcium (Ca)-Total    |                |               | <10    |           | mg/kg |     | 10    | 04-FEB-09 |
| Chromium (Cr)-Total   |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Cobalt (Co)-Total     |                |               | <0.10  |           | mg/kg |     | 0.1   | 04-FEB-09 |
| Copper (Cu)-Total     |                |               | <0.050 |           | mg/kg |     | 0.05  | 04-FEB-09 |
| Lead (Pb)-Total       |                |               | <0.10  |           | mg/kg |     | 0.1   | 04-FEB-09 |
| Lithium (Li)-Total    |                |               | <0.50  |           | mg/kg |     | 0.5   | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |               | <3.0   |           | mg/kg |     | 3     | 04-FEB-09 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R785459</b> |                     |        |           |       |     |        |           |
| <b>WG902859-2</b>     | <b>MB</b>      |                     |        |           |       |     |        |           |
| Manganese (Mn)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 04-FEB-09 |
| Molybdenum (Mo)-Total |                |                     | <0.050 |           | mg/kg |     | 0.05   | 04-FEB-09 |
| Nickel (Ni)-Total     |                |                     | <0.50  |           | mg/kg |     | 0.5    | 04-FEB-09 |
| Strontium (Sr)-Total  |                |                     | <0.050 |           | mg/kg |     | 0.05   | 04-FEB-09 |
| Thallium (Tl)-Total   |                |                     | <0.030 |           | mg/kg |     | 0.03   | 04-FEB-09 |
| Tin (Sn)-Total        |                |                     | <0.20  |           | mg/kg |     | 0.2    | 04-FEB-09 |
| Uranium (U)-Total     |                |                     | <0.010 |           | mg/kg |     | 0.01   | 04-FEB-09 |
| Vanadium (V)-Total    |                |                     | <0.50  |           | mg/kg |     | 0.5    | 04-FEB-09 |
| Zinc (Zn)-Total       |                |                     | <0.50  |           | mg/kg |     | 0.5    | 04-FEB-09 |
| <b>Batch</b>          | <b>R786115</b> |                     |        |           |       |     |        |           |
| <b>WG902859-5</b>     | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 100    |           | %     |     | 66-109 | 05-FEB-09 |
| Barium (Ba)-Total     |                |                     | 119    | RM-H      | %     |     | 90-113 | 05-FEB-09 |
| Calcium (Ca)-Total    |                |                     | 101    |           | %     |     | 87-116 | 05-FEB-09 |
| Copper (Cu)-Total     |                |                     | 103    |           | %     |     | 83-114 | 05-FEB-09 |
| Lead (Pb)-Total       |                |                     | 95     |           | %     |     | 70-117 | 05-FEB-09 |
| Magnesium (Mg)-Total  |                |                     | 119    | RM-H      | %     |     | 85-115 | 05-FEB-09 |
| Manganese (Mn)-Total  |                |                     | 113    |           | %     |     | 89-116 | 05-FEB-09 |
| Strontium (Sr)-Total  |                |                     | 116    |           | %     |     | 89-119 | 05-FEB-09 |
| Zinc (Zn)-Total       |                |                     | 105    |           | %     |     | 84-115 | 05-FEB-09 |
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |     |        |           |
| <b>Batch</b>          | <b>R784525</b> |                     |        |           |       |     |        |           |
| <b>WG901915-4</b>     | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |       |     |        |           |
| Aluminum (Al)-Total   |                |                     | 78     |           | %     |     | 69-112 | 30-JAN-09 |
| Barium (Ba)-Total     |                |                     | 87     |           | %     |     | 83-119 | 30-JAN-09 |
| Calcium (Ca)-Total    |                |                     | 98     |           | %     |     | 87-114 | 30-JAN-09 |
| Chromium (Cr)-Total   |                |                     | 87     |           | %     |     | 48-89  | 30-JAN-09 |
| Copper (Cu)-Total     |                |                     | 103    |           | %     |     | 86-115 | 30-JAN-09 |
| Lead (Pb)-Total       |                |                     | 102    |           | %     |     | 79-120 | 30-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | 100    |           | %     |     | 65-135 | 30-JAN-09 |
| Manganese (Mn)-Total  |                |                     | 90     |           | %     |     | 86-117 | 30-JAN-09 |
| Strontium (Sr)-Total  |                |                     | 97     |           | %     |     | 93-125 | 30-JAN-09 |
| Zinc (Zn)-Total       |                |                     | 102    |           | %     |     | 84-120 | 30-JAN-09 |
| <b>WG901915-5</b>     | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |       |     |        |           |

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units    | RPD    | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|----------|--------|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |          |        |        |           |
| <b>Batch</b>          | <b>R784525</b> |                     |         |           |          |        |        |           |
| <b>WG901915-5 CRM</b> |                | <b>VA-NIST-1515</b> |         |           |          |        |        |           |
| Aluminum (Al)-Total   |                |                     | 82      |           | %        |        | 66-109 | 30-JAN-09 |
| Barium (Ba)-Total     |                |                     | 87      | RM-L      | %        |        | 90-113 | 30-JAN-09 |
| Calcium (Ca)-Total    |                |                     | 98      |           | %        |        | 87-116 | 30-JAN-09 |
| Copper (Cu)-Total     |                |                     | 102     |           | %        |        | 83-114 | 30-JAN-09 |
| Lead (Pb)-Total       |                |                     | 109     |           | %        |        | 70-117 | 30-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | 96      |           | %        |        | 85-115 | 30-JAN-09 |
| Manganese (Mn)-Total  |                |                     | 88      | RM-L      | %        |        | 89-116 | 30-JAN-09 |
| Strontium (Sr)-Total  |                |                     | 91      |           | %        |        | 89-119 | 30-JAN-09 |
| Zinc (Zn)-Total       |                |                     | 101     |           | %        |        | 84-115 | 30-JAN-09 |
| <b>WG901915-3 DUP</b> |                | <b>L719088-43</b>   |         |           |          |        |        |           |
| Aluminum (Al)-Total   |                | 3.6                 | 3.5     | J         | mg/kg ww | 0.2    | 8      | 30-JAN-09 |
| Antimony (Sb)-Total   |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Barium (Ba)-Total     |                | 5.25                | 5.05    |           | mg/kg ww | 4.0    | 45     | 30-JAN-09 |
| Beryllium (Be)-Total  |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Bismuth (Bi)-Total    |                | <0.030              | <0.030  | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Cadmium (Cd)-Total    |                | 0.0069              | 0.0064  | J         | mg/kg ww | 0.0005 | 0.02   | 30-JAN-09 |
| Calcium (Ca)-Total    |                | 1030                | 968     |           | mg/kg ww | 6.2    | 45     | 30-JAN-09 |
| Chromium (Cr)-Total   |                | 0.18                | 0.18    | J         | mg/kg ww | 0.01   | 0.4    | 30-JAN-09 |
| Cobalt (Co)-Total     |                | 0.054               | 0.052   | J         | mg/kg ww | 0.003  | 0.08   | 30-JAN-09 |
| Copper (Cu)-Total     |                | 3.30                | 3.16    |           | mg/kg ww | 4.4    | 45     | 30-JAN-09 |
| Lead (Pb)-Total       |                | <0.020              | <0.020  | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Lithium (Li)-Total    |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Magnesium (Mg)-Total  |                | 616                 | 596     |           | mg/kg ww | 3.3    | 45     | 30-JAN-09 |
| Manganese (Mn)-Total  |                | 82.9                | 79.8    |           | mg/kg ww | 3.8    | 45     | 30-JAN-09 |
| Molybdenum (Mo)-Total |                | 0.329               | 0.318   |           | mg/kg ww | 3.3    | 45     | 30-JAN-09 |
| Nickel (Ni)-Total     |                | 0.12                | 0.17    | J         | mg/kg ww | 0.05   | 0.4    | 30-JAN-09 |
| Strontium (Sr)-Total  |                | 6.61                | 6.04    |           | mg/kg ww | 8.9    | 45     | 30-JAN-09 |
| Thallium (Tl)-Total   |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Tin (Sn)-Total        |                | <0.050              | 0.051   | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Uranium (U)-Total     |                | <0.0020             | <0.0020 | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Vanadium (V)-Total    |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45     | 30-JAN-09 |
| Zinc (Zn)-Total       |                | 6.05                | 5.83    |           | mg/kg ww | 3.7    | 45     | 30-JAN-09 |
| <b>WG901915-1 MB</b>  |                |                     |         |           |          |        |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0    |           | mg/kg ww |        | 2      | 30-JAN-09 |



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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R784525</b> |               |         |           |          |     |       |           |
| <b>WG901915-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 30-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 30-JAN-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 30-JAN-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 30-JAN-09 |
| Copper (Cu)-Total     |                |               | 0.028   | MB-LOR    | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 30-JAN-09 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 30-JAN-09 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 30-JAN-09 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 30-JAN-09 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Zinc (Zn)-Total       |                |               | 0.14    | MB-LOR    | mg/kg ww |     | 0.1   | 30-JAN-09 |
| <b>WG901915-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 30-JAN-09 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 30-JAN-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 30-JAN-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 30-JAN-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 30-JAN-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 30-JAN-09 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 30-JAN-09 |

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| Test                  | Matrix         | Reference           | Result  | Qualifier | Units    | RPD | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|---------|-----------|----------|-----|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |         |           |          |     |        |           |
| <b>Batch</b>          | <b>R784525</b> |                     |         |           |          |     |        |           |
| <b>WG901915-2</b>     | <b>MB</b>      |                     |         |           |          |     |        |           |
| Lead (Pb)-Total       |                |                     | <0.020  |           | mg/kg ww |     | 0.02   | 30-JAN-09 |
| Lithium (Li)-Total    |                |                     | 0.15    | MB-LOR    | mg/kg ww |     | 0.1    | 30-JAN-09 |
| Magnesium (Mg)-Total  |                |                     | <1.0    |           | mg/kg ww |     | 1      | 30-JAN-09 |
| Manganese (Mn)-Total  |                |                     | 0.011   | MB-LOR    | mg/kg ww |     | 0.01   | 30-JAN-09 |
| Molybdenum (Mo)-Total |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 30-JAN-09 |
| Nickel (Ni)-Total     |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 30-JAN-09 |
| Strontium (Sr)-Total  |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 30-JAN-09 |
| Thallium (Tl)-Total   |                |                     | <0.010  |           | mg/kg ww |     | 0.01   | 30-JAN-09 |
| Tin (Sn)-Total        |                |                     | <0.050  |           | mg/kg ww |     | 0.05   | 30-JAN-09 |
| Uranium (U)-Total     |                |                     | <0.0020 |           | mg/kg ww |     | 0.002  | 30-JAN-09 |
| Vanadium (V)-Total    |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 30-JAN-09 |
| Zinc (Zn)-Total       |                |                     | <0.10   |           | mg/kg ww |     | 0.1    | 30-JAN-09 |
| <b>Batch</b>          | <b>R784978</b> |                     |         |           |          |     |        |           |
| <b>WG901915-3</b>     | <b>DUP</b>     | <b>L719088-43</b>   |         |           |          |     |        |           |
| Arsenic (As)-Total    |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A | 45     | 03-FEB-09 |
| <b>Batch</b>          | <b>R785413</b> |                     |         |           |          |     |        |           |
| <b>WG902859-4</b>     | <b>CRM</b>     | <b>VA-NIST-1547</b> |         |           |          |     |        |           |
| Aluminum (Al)-Total   |                |                     | 93      |           | %        |     | 69-112 | 04-FEB-09 |
| Barium (Ba)-Total     |                |                     | 87      |           | %        |     | 83-119 | 04-FEB-09 |
| Calcium (Ca)-Total    |                |                     | 98      |           | %        |     | 87-114 | 04-FEB-09 |
| Chromium (Cr)-Total   |                |                     | 78      |           | %        |     | 48-89  | 04-FEB-09 |
| Copper (Cu)-Total     |                |                     | 101     |           | %        |     | 86-115 | 04-FEB-09 |
| Lead (Pb)-Total       |                |                     | 98      |           | %        |     | 79-120 | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |                     | 104     |           | %        |     | 65-135 | 04-FEB-09 |
| Manganese (Mn)-Total  |                |                     | 91      |           | %        |     | 86-117 | 04-FEB-09 |
| Strontium (Sr)-Total  |                |                     | 95      |           | %        |     | 93-125 | 04-FEB-09 |
| Zinc (Zn)-Total       |                |                     | 108     |           | %        |     | 84-120 | 04-FEB-09 |
| <b>WG902859-3</b>     | <b>DUP</b>     | <b>L719088-47</b>   |         |           |          |     |        |           |
| Aluminum (Al)-Total   |                | 13.7                | 11.2    | J         | mg/kg ww | 2.5 | 8      | 04-FEB-09 |
| Antimony (Sb)-Total   |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A | 45     | 04-FEB-09 |
| Arsenic (As)-Total    |                | <0.010              | <0.010  | RPD-NA    | mg/kg ww | N/A | 45     | 04-FEB-09 |
| Barium (Ba)-Total     |                | 10.2                | 10.6    |           | mg/kg ww | 3.7 | 45     | 04-FEB-09 |
| Beryllium (Be)-Total  |                | <0.10               | <0.10   | RPD-NA    | mg/kg ww | N/A | 45     | 04-FEB-09 |

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| Test                  | Matrix         | Reference         | Result  | Qualifier | Units    | RPD    | Limit | Analyzed  |
|-----------------------|----------------|-------------------|---------|-----------|----------|--------|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>     |         |           |          |        |       |           |
| <b>Batch</b>          | <b>R785413</b> |                   |         |           |          |        |       |           |
| <b>WG902859-3</b>     | <b>DUP</b>     | <b>L719088-47</b> |         |           |          |        |       |           |
| Bismuth (Bi)-Total    |                | <0.030            | <0.030  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Cadmium (Cd)-Total    |                | 0.0171            | 0.0176  | J         | mg/kg ww | 0.0005 | 0.02  | 04-FEB-09 |
| Calcium (Ca)-Total    |                | 1390              | 1370    |           | mg/kg ww | 0.75   | 45    | 04-FEB-09 |
| Chromium (Cr)-Total   |                | <0.10             | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Cobalt (Co)-Total     |                | 0.071             | 0.069   | J         | mg/kg ww | 0.002  | 0.08  | 04-FEB-09 |
| Copper (Cu)-Total     |                | 6.17              | 6.02    |           | mg/kg ww | 2.4    | 45    | 04-FEB-09 |
| Lead (Pb)-Total       |                | <0.020            | <0.020  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Lithium (Li)-Total    |                | 0.28              | 0.27    | J         | mg/kg ww | 0.02   | 0.4   | 04-FEB-09 |
| Magnesium (Mg)-Total  |                | 841               | 811     |           | mg/kg ww | 3.6    | 45    | 04-FEB-09 |
| Manganese (Mn)-Total  |                | 114               | 113     |           | mg/kg ww | 0.88   | 45    | 04-FEB-09 |
| Molybdenum (Mo)-Total |                | 0.345             | 0.348   |           | mg/kg ww | 1.1    | 45    | 04-FEB-09 |
| Nickel (Ni)-Total     |                | <0.10             | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Strontium (Sr)-Total  |                | 8.89              | 9.00    |           | mg/kg ww | 1.2    | 45    | 04-FEB-09 |
| Thallium (Tl)-Total   |                | <0.010            | <0.010  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Tin (Sn)-Total        |                | <0.050            | <0.050  | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Uranium (U)-Total     |                | <0.0020           | <0.0020 | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Vanadium (V)-Total    |                | <0.10             | <0.10   | RPD-NA    | mg/kg ww | N/A    | 45    | 04-FEB-09 |
| Zinc (Zn)-Total       |                | 14.8              | 14.1    |           | mg/kg ww | 5.0    | 45    | 04-FEB-09 |
| <b>WG902859-1</b>     | <b>MB</b>      |                   |         |           |          |        |       |           |
| Aluminum (Al)-Total   |                |                   | <2.0    |           | mg/kg ww |        | 2     | 04-FEB-09 |
| Antimony (Sb)-Total   |                |                   | <0.010  |           | mg/kg ww |        | 0.01  | 04-FEB-09 |
| Arsenic (As)-Total    |                |                   | <0.010  |           | mg/kg ww |        | 0.01  | 04-FEB-09 |
| Barium (Ba)-Total     |                |                   | <0.010  |           | mg/kg ww |        | 0.01  | 04-FEB-09 |
| Beryllium (Be)-Total  |                |                   | <0.10   |           | mg/kg ww |        | 0.1   | 04-FEB-09 |
| Bismuth (Bi)-Total    |                |                   | <0.030  |           | mg/kg ww |        | 0.03  | 04-FEB-09 |
| Cadmium (Cd)-Total    |                |                   | <0.0050 |           | mg/kg ww |        | 0.005 | 04-FEB-09 |
| Calcium (Ca)-Total    |                |                   | <2.0    |           | mg/kg ww |        | 2     | 04-FEB-09 |
| Chromium (Cr)-Total   |                |                   | <0.10   |           | mg/kg ww |        | 0.1   | 04-FEB-09 |
| Cobalt (Co)-Total     |                |                   | <0.020  |           | mg/kg ww |        | 0.02  | 04-FEB-09 |
| Copper (Cu)-Total     |                |                   | <0.010  |           | mg/kg ww |        | 0.01  | 04-FEB-09 |
| Lead (Pb)-Total       |                |                   | <0.020  |           | mg/kg ww |        | 0.02  | 04-FEB-09 |
| Lithium (Li)-Total    |                |                   | <0.10   |           | mg/kg ww |        | 0.1   | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |                   | <1.0    |           | mg/kg ww |        | 1     | 04-FEB-09 |
| Manganese (Mn)-Total  |                |                   | <0.010  |           | mg/kg ww |        | 0.01  | 04-FEB-09 |

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R785413</b> |               |         |           |          |     |       |           |
| <b>WG902859-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 04-FEB-09 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 04-FEB-09 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| <b>WG902859-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 04-FEB-09 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 04-FEB-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 04-FEB-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 04-FEB-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 04-FEB-09 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 04-FEB-09 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 04-FEB-09 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 04-FEB-09 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 04-FEB-09 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 04-FEB-09 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 04-FEB-09 |

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| Test                               | Matrix  | Reference    | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|------------------------------------|---------|--------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-WET-MS-VA Tissue</b>        |         |              |        |           |       |      |        |           |
| Batch                              | R786103 |              |        |           |       |      |        |           |
| WG902859-5                         | CRM     | VA-NIST-1515 |        |           |       |      |        |           |
| Aluminum (Al)-Total                |         |              | 100    |           | %     |      | 66-109 | 05-FEB-09 |
| Barium (Ba)-Total                  |         |              | 119    | RM-H      | %     |      | 90-113 | 05-FEB-09 |
| Calcium (Ca)-Total                 |         |              | 101    |           | %     |      | 87-116 | 05-FEB-09 |
| Copper (Cu)-Total                  |         |              | 103    |           | %     |      | 83-114 | 05-FEB-09 |
| Lead (Pb)-Total                    |         |              | 95     |           | %     |      | 70-117 | 05-FEB-09 |
| Magnesium (Mg)-Total               |         |              | 119    | RM-H      | %     |      | 85-115 | 05-FEB-09 |
| Manganese (Mn)-Total               |         |              | 113    |           | %     |      | 89-116 | 05-FEB-09 |
| Strontium (Sr)-Total               |         |              | 116    |           | %     |      | 89-119 | 05-FEB-09 |
| Zinc (Zn)-Total                    |         |              | 105    |           | %     |      | 84-115 | 05-FEB-09 |
| <b>MOISTURE-TISS-VA Tissue</b>     |         |              |        |           |       |      |        |           |
| Batch                              | R783811 |              |        |           |       |      |        |           |
| WG901810-1                         | DUP     | L719088-36   |        |           |       |      |        |           |
| % Moisture                         |         | 85.5         | 85.7   |           | %     | 0.22 | 30     | 30-JAN-09 |
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |         |              |        |           |       |      |        |           |
| Batch                              | R782228 |              |        |           |       |      |        |           |
| WG897870-2                         | LCS     |              |        |           |       |      |        |           |
| alpha-BHC                          |         |              | 91     |           | %     |      | 50-150 | 26-JAN-09 |
| Lindane (gamma - BHC)              |         |              | 91     |           | %     |      | 50-150 | 26-JAN-09 |
| beta-BHC                           |         |              | 92     |           | %     |      | 50-150 | 26-JAN-09 |
| delta-BHC                          |         |              | 98     |           | %     |      | 50-150 | 26-JAN-09 |
| Heptachlor                         |         |              | 87     |           | %     |      | 50-150 | 26-JAN-09 |
| Aldrin                             |         |              | 90     |           | %     |      | 50-150 | 26-JAN-09 |
| Oxychlordane                       |         |              | 93     |           | %     |      | 50-150 | 26-JAN-09 |
| 2,4'-DDE                           |         |              | 107    |           | %     |      | 50-150 | 26-JAN-09 |
| Heptachlor Epoxide                 |         |              | 115    |           | %     |      | 50-150 | 26-JAN-09 |
| trans-Chlordane (gamma)            |         |              | 93     |           | %     |      | 50-150 | 26-JAN-09 |
| trans-Nonachlor                    |         |              | 95     |           | %     |      | 50-150 | 26-JAN-09 |
| cis-Chlordane (alpha)              |         |              | 92     |           | %     |      | 50-150 | 26-JAN-09 |
| 4,4'-DDE                           |         |              | 95     |           | %     |      | 50-150 | 26-JAN-09 |
| Endosulfan I                       |         |              | 93     |           | %     |      | 50-150 | 26-JAN-09 |
| 2,4'-DDD                           |         |              | 95     |           | %     |      | 50-150 | 26-JAN-09 |
| Dieldrin                           |         |              | 96     |           | %     |      | 50-150 | 26-JAN-09 |
| 2,4'-DDT                           |         |              | 94     |           | %     |      | 50-150 | 26-JAN-09 |

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| Test                               | Matrix         | Reference | Result | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------------------|----------------|-----------|--------|-----------|-----------|-----|--------|-----------|
| <b>OCP1-TWET-SOX-ECD-VA Tissue</b> |                |           |        |           |           |     |        |           |
| <b>Batch</b>                       | <b>R782228</b> |           |        |           |           |     |        |           |
| <b>WG897870-2</b>                  | <b>LCS</b>     |           |        |           |           |     |        |           |
| Endrin                             |                |           | 107    |           | %         |     | 50-150 | 26-JAN-09 |
| cis-Nonachlor                      |                |           | 94     |           | %         |     | 50-150 | 26-JAN-09 |
| 4,4'-DDD                           |                |           | 95     |           | %         |     | 50-150 | 26-JAN-09 |
| Endosulfan II                      |                |           | 98     |           | %         |     | 50-150 | 26-JAN-09 |
| 4,4'-DDT                           |                |           | 91     |           | %         |     | 50-150 | 26-JAN-09 |
| Methoxychlor                       |                |           | 103    |           | %         |     | 50-150 | 26-JAN-09 |
| Mirex                              |                |           | 91     |           | %         |     | 50-150 | 26-JAN-09 |
| Endosulfan Sulfate                 |                |           | 133    |           | %         |     | 50-150 | 26-JAN-09 |
| <b>WG897870-1</b>                  | <b>MB</b>      |           |        |           |           |     |        |           |
| alpha-BHC                          |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Lindane (gamma - BHC)              |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| beta-BHC                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| delta-BHC                          |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Heptachlor                         |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Aldrin                             |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Oxychlordane                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 2,4'-DDE                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Heptachlor Epoxide                 |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| trans-Chlordane (gamma)            |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| trans-Nonachlor                    |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| cis-Chlordane (alpha)              |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 4,4'-DDE                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Endosulfan I                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 2,4'-DDD                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Dieldrin                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 2,4'-DDT                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Endrin                             |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| cis-Nonachlor                      |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 4,4'-DDD                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Endosulfan II                      |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| 4,4'-DDT                           |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Methoxychlor                       |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Mirex                              |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Endosulfan Sulfate                 |                |           | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |

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| Test                       | Matrix         | Reference     | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|---------------|--------|-----------|-------|-----|--------|-----------|
| <b>PAH-T-DRY-SOX-MS-VA</b> |                | <b>Tissue</b> |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R782105</b> |               |        |           |       |     |        |           |
| <b>WG897870-1</b>          | <b>MB</b>      |               |        |           |       |     |        |           |
| Acenaphthene               |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Acenaphthylene             |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Anthracene                 |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Benz(a)anthracene          |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Benzo(a)pyrene             |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Benzo(b)fluoranthene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Benzo(g,h,i)perylene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Benzo(k)fluoranthene       |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Chrysene                   |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Dibenz(a,h)anthracene      |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Fluoranthene               |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Fluorene                   |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene    |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Naphthalene                |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Phenanthrene               |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| Pyrene                     |                |               | <0.050 |           | mg/kg |     | 0.05   | 26-JAN-09 |
| <b>PAH-T-WET-SOX-MS-VA</b> |                | <b>Tissue</b> |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R782105</b> |               |        |           |       |     |        |           |
| <b>WG897870-2</b>          | <b>LCS</b>     |               |        |           |       |     |        |           |
| Acenaphthene               |                |               | 116    |           | %     |     | 55-145 | 26-JAN-09 |
| Acenaphthylene             |                |               | 116    |           | %     |     | 55-145 | 26-JAN-09 |
| Anthracene                 |                |               | 114    |           | %     |     | 55-145 | 26-JAN-09 |
| Benz(a)anthracene          |                |               | 117    |           | %     |     | 55-145 | 26-JAN-09 |
| Benzo(a)pyrene             |                |               | 116    |           | %     |     | 55-145 | 26-JAN-09 |
| Benzo(b)fluoranthene       |                |               | 121    |           | %     |     | 55-145 | 26-JAN-09 |
| Benzo(g,h,i)perylene       |                |               | 128    |           | %     |     | 55-145 | 26-JAN-09 |
| Benzo(k)fluoranthene       |                |               | 123    |           | %     |     | 55-145 | 26-JAN-09 |
| Chrysene                   |                |               | 122    |           | %     |     | 55-145 | 26-JAN-09 |
| Dibenz(a,h)anthracene      |                |               | 124    |           | %     |     | 55-145 | 26-JAN-09 |
| Fluoranthene               |                |               | 121    |           | %     |     | 55-145 | 26-JAN-09 |
| Fluorene                   |                |               | 118    |           | %     |     | 55-145 | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene    |                |               | 124    |           | %     |     | 55-145 | 26-JAN-09 |
| Naphthalene                |                |               | 112    |           | %     |     | 55-145 | 26-JAN-09 |
| Phenanthrene               |                |               | 121    |           | %     |     | 55-145 | 26-JAN-09 |

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| Test                            | Matrix         | Reference     | Result | Qualifier | Units     | RPD | Limit  | Analyzed  |
|---------------------------------|----------------|---------------|--------|-----------|-----------|-----|--------|-----------|
| <b>PAH-T-WET-SOX-MS-VA</b>      |                | <b>Tissue</b> |        |           |           |     |        |           |
| <b>Batch</b>                    | <b>R782105</b> |               |        |           |           |     |        |           |
| <b>WG897870-2</b>               | <b>LCS</b>     |               |        |           |           |     |        |           |
| Phenanthrene                    |                |               | 121    |           | %         |     | 55-145 | 26-JAN-09 |
| Pyrene                          |                |               | 121    |           | %         |     | 55-145 | 26-JAN-09 |
| <b>WG897870-1</b>               | <b>MB</b>      |               |        |           |           |     |        |           |
| Acenaphthene                    |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Acenaphthylene                  |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Anthracene                      |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Benz(a)anthracene               |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Benzo(a)pyrene                  |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Benzo(b)fluoranthene            |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Benzo(g,h,i)perylene            |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Benzo(k)fluoranthene            |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Chrysene                        |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Dibenz(a,h)anthracene           |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Fluoranthene                    |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Fluorene                        |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Indeno(1,2,3-c,d)pyrene         |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Naphthalene                     |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Phenanthrene                    |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| Pyrene                          |                |               | <0.010 |           | mg/kg wwt |     | 0.01   | 26-JAN-09 |
| <b>PCB-T-WET-SOX-ECD-VA</b>     |                | <b>Tissue</b> |        |           |           |     |        |           |
| <b>Batch</b>                    | <b>R782228</b> |               |        |           |           |     |        |           |
| <b>WG897870-2</b>               | <b>LCS</b>     |               |        |           |           |     |        |           |
| PCB-1260                        |                |               | 95     |           | %         |     | 50-150 | 26-JAN-09 |
| <b>WG897870-1</b>               | <b>MB</b>      |               |        |           |           |     |        |           |
| Total Polychlorinated Biphenyls |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1016                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1221                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1232                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1242                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1248                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1254                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1260                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1262                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |
| PCB-1268                        |                |               | <0.050 |           | mg/kg wwt |     | 0.05   | 26-JAN-09 |



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| Test                   | Matrix         | Reference           | Result | Qualifier | Units     | RPD   | Limit | Analyzed  |
|------------------------|----------------|---------------------|--------|-----------|-----------|-------|-------|-----------|
| <b>SE-DRY-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |       |       |           |
| <b>Batch</b>           | <b>R784818</b> |                     |        |           |           |       |       |           |
| <b>WG901915-4</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |           |       |       |           |
| <b>WG901915-5</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |       |       |           |
| <b>WG901915-3</b>      | <b>DUP</b>     | <b>L719088-43</b>   |        |           |           |       |       |           |
| Selenium (Se)-Total    |                | 0.29                | 0.15   | J         | mg/kg     | 0.14  | 0.4   | 03-FEB-09 |
| <b>WG901915-1</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |       | 0.1   | 03-FEB-09 |
| <b>WG901915-2</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |       | 0.1   | 03-FEB-09 |
| <b>Batch</b>           | <b>R786137</b> |                     |        |           |           |       |       |           |
| <b>WG902859-4</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |           |       |       |           |
| <b>WG902859-5</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |       |       |           |
| <b>WG902859-3</b>      | <b>DUP</b>     | <b>L719088-47</b>   |        |           |           |       |       |           |
| Selenium (Se)-Total    |                | 0.11                | 0.14   | J         | mg/kg     | 0.02  | 0.4   | 05-FEB-09 |
| <b>WG902859-1</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |       | 0.1   | 05-FEB-09 |
| <b>WG902859-2</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.10  |           | mg/kg     |       | 0.1   | 05-FEB-09 |
| <b>SE-WET-HVAAS-VA</b> |                | <b>Tissue</b>       |        |           |           |       |       |           |
| <b>Batch</b>           | <b>R784819</b> |                     |        |           |           |       |       |           |
| <b>WG901915-4</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |           |       |       |           |
| <b>WG901915-5</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |       |       |           |
| <b>WG901915-3</b>      | <b>DUP</b>     | <b>L719088-43</b>   |        |           |           |       |       |           |
| Selenium (Se)-Total    |                | 0.071               | 0.037  | J         | mg/kg wwt | 0.033 | 0.08  | 03-FEB-09 |
| <b>WG901915-1</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |       | 0.02  | 03-FEB-09 |
| <b>WG901915-2</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |       | 0.02  | 03-FEB-09 |
| <b>Batch</b>           | <b>R786138</b> |                     |        |           |           |       |       |           |
| <b>WG902859-4</b>      | <b>CRM</b>     | <b>VA-NIST-1547</b> |        |           |           |       |       |           |
| <b>WG902859-5</b>      | <b>CRM</b>     | <b>VA-NIST-1515</b> |        |           |           |       |       |           |
| <b>WG902859-3</b>      | <b>DUP</b>     | <b>L719088-47</b>   |        |           |           |       |       |           |
| Selenium (Se)-Total    |                | 0.025               | 0.030  | J         | mg/kg wwt | 0.005 | 0.08  | 05-FEB-09 |
| <b>WG902859-1</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |       | 0.02  | 05-FEB-09 |
| <b>WG902859-2</b>      | <b>MB</b>      |                     |        |           |           |       |       |           |
| Selenium (Se)-Total    |                |                     | <0.020 |           | mg/kg wwt |       | 0.02  | 05-FEB-09 |

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### Legend:

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

### Sample Parameter Qualifier Definitions:

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| Qualifier | Description                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                                                                                          |
| MB-LOR    | Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required.                                                                 |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.                                                                 |
| RM-L      | Reference Material recovery was below ALS DQO. Lab Control Sample and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                                                                                          |

GENF14.00



|                                                                                                                                                   |                                                                       |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|----------|----------------------------------------------------|----------------------|--------------|--|------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| REPORT TO:                                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                            |          | SERVICE REQUESTED                                  |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| COMPANY: <u>Golder</u>                                                                                                                            |                                                                       | STANDARD _____ OTHER _____                              |          | REGULAR SERVICE (DEFAULT)                          |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | PDF _____ EXCEL _____ CUSTOM _____ FAX _____            |          | RUSH SERVICE (2-3 DAYS)                            |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | EMAIL 1:                                                |          | PRIORITY SERVICE (1 DAY or ASAP)                   |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | EMAIL 2:                                                |          | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |                                                         |          | ANALYSIS REQUEST                                   |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P)      → → → |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                           |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | JOB #: <u>07-1334-6018</u>                              |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                               |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | Legal Site Description:                                 |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       | QUOTE #:                                                |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| Lab Work Order / Lab use only: <u>4710-00</u>                                                                                                     |                                                                       |                                                         |          | SAMPLER (Initials):                                |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) |                                                         | DATE     | TIME                                               | SAMPLE TYPE          |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 11                                                                                                                                                | 0534485-0976630-Fruit (Metal)                                         |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 12                                                                                                                                                | " - Fruit (ORGANIC)                                                   |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 13                                                                                                                                                | " - Leaves 1 (Metal)                                                  |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 14                                                                                                                                                | " - Leaves 2 (Metal)                                                  |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 15                                                                                                                                                | " - Leaves (ORGANIC)                                                  |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 16                                                                                                                                                | " - Hoja 1                                                            |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 17                                                                                                                                                | 0536353-0987255 - Fruits A (Metal)                                    |                                                         | 5-OCT-08 |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 18                                                                                                                                                | " - Fruits A (ORGANIC)                                                |                                                         | "        |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 19                                                                                                                                                | " - Fruit B (Metal)                                                   |                                                         | "        |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| 20                                                                                                                                                | " - Fruit B (ORGANIC)                                                 |                                                         | "        |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| GUIDELINES / REGULATIONS                                                                                                                          |                                                                       |                                                         |          |                                                    | SPECIAL INSTRUCTIONS |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| SAMPLES RECEIVED WITHOUT COC                                                                                                                      |                                                                       |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                       |                                                         |          |                                                    |                      |              |  |                                                                                          |  |  |  |  |  |  |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |          | RECEIVED BY:                                       |                      | DATE & TIME: |  |                                                                                          |  |  |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |          | RECEIVED BY:                                       |                      | DATE & TIME: |  | TEMPERATURE: _____ SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details) |  |  |  |  |  |  |  |  |  |



## CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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**06636**

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**Environmental Division**

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## GUIDELINES / REGULATIONS

**SPECIAL NOTE:**

S / REGULATIONS | SPECIAL INSTRUCTIONS

SAMPLES RECEIVED WITHOUT COC

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**By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.**

|                  |              |              |              |             |                                                                          |
|------------------|--------------|--------------|--------------|-------------|--------------------------------------------------------------------------|
| RELINQUISHED BY: | DATE & TIME: | RECEIVED BY: | DATE & TIME: | TEMPERATURE | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |
| RELINQUISHED BY: | DATE & TIME: | RECEIVED BY: | DATE & TIME: |             |                                                                          |



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|                                                                                                                                                   |                                                                       |  |                                                       |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--|-------------------------------------------------------|------|--------------|----------------------------------------------------|--|--------------|--|-------------|--|--------------------------------------------------------------------------|--|--|--|--|--|
| <b>REPORT TO:</b>                                                                                                                                 |                                                                       |  | <b>REPORT FORMAT / DISTRIBUTION</b>                   |      |              | <b>SERVICE REQUESTED</b>                           |  |              |  |             |  |                                                                          |  |  |  |  |  |
| COMPANY: <u>Golden</u>                                                                                                                            |                                                                       |  | STANDARD _____ OTHER _____                            |      |              | REGULAR SERVICE (DEFAULT)                          |  |              |  |             |  |                                                                          |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       |  | PDF _____ EXCEL _____ CUSTOM _____ FAX _____          |      |              | RUSH SERVICE (2-3 DAYS)                            |  |              |  |             |  |                                                                          |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       |  | EMAIL 1:                                              |      |              | PRIORITY SERVICE (1 DAY or ASAP)                   |  |              |  |             |  |                                                                          |  |  |  |  |  |
|                                                                                                                                                   |                                                                       |  | EMAIL 2:                                              |      |              | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |  |              |  |             |  |                                                                          |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |  |                                                       |      |              | <b>ANALYSIS REQUEST</b>                            |  |              |  |             |  |                                                                          |  |  |  |  |  |
| INVOICE TO: <b>SAME AS REPORT ? YES / NO</b>                                                                                                      |                                                                       |  | INDICATE BOTTLES: FILTERED / PRESERVED (F/P)    → → → |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       |  | <b>CLIENT / PROJECT INFORMATION:</b>                  |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       |  | JOB #: <u>07-1334-0018</u>                            |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       |  | PO / AFE:                                             |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
|                                                                                                                                                   |                                                                       |  | Legal Site Description:                               |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |  | QUOTE #:                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| Lab Work Order # _____<br>(lab use only)                                                                                                          |                                                                       |  | SAMPLER (Initials):                                   |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) |  | DATE                                                  | TIME | SAMPLE TYPE  |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 31                                                                                                                                                | <u>0539137-0978302 - Leaves 1 (Organic)</u>                           |  | <u>4-OCT-08</u>                                       |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 32                                                                                                                                                | <u>" - Leaves 1 (Metals)</u>                                          |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 33                                                                                                                                                | <u>" - Leaves 2 (Organic)</u>                                         |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 34                                                                                                                                                | <u>" - Leaves 2 (Metals)</u>                                          |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 35                                                                                                                                                | <u>" - Leaves (Metals)</u>                                            |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 36                                                                                                                                                | <u>0536450-0978888 - Fruto A (Metals)</u>                             |  | <u>6-OCT-08</u>                                       |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 37                                                                                                                                                | <u>" (ORGANIC)</u>                                                    |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 38                                                                                                                                                | <u>" FRUTO B (Metals)</u>                                             |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 39                                                                                                                                                | <u>" (ORGANIC)</u>                                                    |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| 40                                                                                                                                                | <u>" Hoja A (Metal)</u>                                               |  | <u>"</u>                                              |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
| <b>GUIDELINES / REGULATIONS</b>                                                                                                                   |                                                                       |  |                                                       |      |              | <b>SPECIAL INSTRUCTIONS</b>                        |  |              |  |             |  | SAMPLES RECEIVED WITHOUT COC                                             |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form <b>LEGIBLY</b> .                                       |                                                                       |  |                                                       |      |              |                                                    |  |              |  |             |  |                                                                          |  |  |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       |  | DATE & TIME:                                          |      | RECEIVED BY: |                                                    |  | DATE & TIME: |  | TEMPERATURE |  | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       |  | DATE & TIME:                                          |      | RECEIVED BY: |                                                    |  | DATE & TIME: |  |             |  |                                                                          |  |  |  |  |  |



## CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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## Environmental Division

|                                                                                                                                                   |                                                                       |                                                         |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------|----------------------|----------------------------------------------------|-------------|--------------|--|-------------|--|--|--|--|--|--------------------------------------------------------------------------|--|--|--|
| REPORT TO:                                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                            |                      | SERVICE REQUESTED                                  |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| COMPANY: <u>Golden</u>                                                                                                                            |                                                                       | STANDARD _____ OTHER _____                              |                      | REGULAR SERVICE (DEFAULT)                          |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | PDF _____ EXCEL _____ CUSTOM _____ FAX _____            |                      | RUSH SERVICE (2-3 DAYS)                            |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | EMAIL 1:                                                |                      | PRIORITY SERVICE (1 DAY or ASAP)                   |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
|                                                                                                                                                   |                                                                       | EMAIL 2:                                                |                      | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |                                                         |                      | ANALYSIS REQUEST                                   |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P)      → → → |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                           |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | JOB #: <u>07-1334-0018</u>                              |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                               |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
|                                                                                                                                                   |                                                                       | Legal Site Description:                                 |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       | QUOTE #:                                                |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| Lab Work Order<br>(lab use only)                                                                                                                  |                                                                       |                                                         |                      | SAMPLER<br>(Initials):                             |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) |                                                         | DATE                 | TIME                                               | SAMPLE TYPE |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 41                                                                                                                                                | 0536450-0978838-Hoja B-1 (metals)                                     |                                                         | 6-OCT-08             |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 42                                                                                                                                                | " - Hoja B-2 (organics)                                               |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 43                                                                                                                                                | 0529754-0981600 - Fruit 1 (metals)                                    |                                                         | 7-OCT-08             |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 44                                                                                                                                                | " " (organic)                                                         |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 45                                                                                                                                                | " - Fruit 2 (metals)                                                  |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 46                                                                                                                                                | " " (organic)                                                         |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 47                                                                                                                                                | " - Leaves 1 (metals)                                                 |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 48                                                                                                                                                | " " (organic)                                                         |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 49                                                                                                                                                | " - Leaves 2 (metals)                                                 |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| 50                                                                                                                                                | " " (organic)                                                         |                                                         | "                    |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| GUIDELINES / REGULATIONS                                                                                                                          |                                                                       |                                                         | SPECIAL INSTRUCTIONS |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| SAMPLES RECEIVED WITHOUT COC                                                                                                                      |                                                                       |                                                         |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                       |                                                         |                      |                                                    |             |              |  |             |  |  |  |  |  |                                                                          |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |                      | RECEIVED BY:                                       |             | DATE & TIME: |  | TEMPERATURE |  |  |  |  |  | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                            |                      | RECEIVED BY:                                       |             | DATE & TIME: |  |             |  |  |  |  |  |                                                                          |  |  |  |

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|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|----------|----------------------------------------------------|----------------------|--------------|--|--------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| REPORT TO:                                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                       |          | SERVICE REQUESTED                                  |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| COMPANY: <u>Golder</u>                                                                                                                            |                                                                       | STANDARD _____ OTHER _____                         |          | REGULAR SERVICE (DEFAULT)                          |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | PDF _____ EXCEL _____ CUSTOM _____ FAX _____       |          | RUSH SERVICE (2-3 DAYS)                            |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | EMAIL 1:                                           |          | PRIORITY SERVICE (1 DAY or ASAP)                   |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | EMAIL 2:                                           |          | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       |                                                    |          | ANALYSIS REQUEST                                   |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| INVOICE TO: SAME AS REPORT ? YES / NO                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → → |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                      |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| CONTACT:                                                                                                                                          |                                                                       | JOB #: <u>07-1334-0018</u>                         |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                          |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                   |                                                                       | Legal Site Description:                            |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| PHONE: _____ FAX: _____                                                                                                                           |                                                                       | QUOTE #:                                           |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| Lab Work Order #<br>(lab use only)                                                                                                                |                                                                       |                                                    |          | SAMPLER<br>(Initials):                             |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) |                                                    | DATE     | TIME                                               | SAMPLE TYPE          |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 71                                                                                                                                                | 0536226 - 0982152 - Fruit A (metals)                                  |                                                    | 5-OCT-08 |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 72                                                                                                                                                | " Fruit B (organic)                                                   |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 73                                                                                                                                                | " - Leaves A (metals)                                                 |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 74                                                                                                                                                | " - " (organic)                                                       |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 75                                                                                                                                                | " - Hoja B (metals)                                                   |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 76                                                                                                                                                | " - Hoja B (organic)                                                  |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 77                                                                                                                                                | 0538340 - 0981770 - Fruits 1 (organic)                                |                                                    | 6-OCT-08 |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 78                                                                                                                                                | " " (metals)                                                          |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 79                                                                                                                                                | " - Fruit 2 (organic)                                                 |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| 80                                                                                                                                                | " - " (metals)                                                        |                                                    | "        |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| GUIDELINES / REGULATIONS                                                                                                                          |                                                                       |                                                    |          |                                                    | SPECIAL INSTRUCTIONS |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| SAMPLES RECEIVED WITHOUT COC                                                                                                                      |                                                                       |                                                    |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| Failure to complete all portions of this form may delay analysis. Please fill in this form <b>LEGIBLY</b> .                                       |                                                                       |                                                    |          |                                                    |                      |              |  |                                                                                            |  |  |  |  |  |  |  |  |  |
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| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                       |          | RECEIVED BY:                                       |                      | DATE & TIME: |  |                                                                                            |  |  |  |  |  |  |  |  |  |
| RELINQUISHED BY:                                                                                                                                  |                                                                       | DATE & TIME:                                       |          | RECEIVED BY:                                       |                      | DATE & TIME: |  | TEMPERATURE _____ SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO<br>(If no provide details) |  |  |  |  |  |  |  |  |  |

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## CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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**06642**

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Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
ATTN: ADRIAN DE BRUYN  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Report Date: 05-MAY-09 12:49 (MT)  
Version: FINAL REV. 2

Lab Work Order #: **L720815**

Date Received: **23-DEC-08**

Project P.O. #:  
Job Reference: 07-1334-0018  
Legal Site Desc:  
CofC Numbers:

Other Information:

**Comments:**

May 5, 2009 - Boron data has been added for the sediment samples in this report. Please note that this parameter is not part of accredited scope, and data should be considered qualitative.

JANINE WEEKS  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                              | L720815-1       | L720815-2       | L720815-3       | L720815-4       | L720815-5       |
|-----------------------------------------------------------------------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                                       |                              | 05-OCT-08       | 06-OCT-08       | 04-OCT-08       | 04-OCT-08       | 07-OCT-08       |
|                                                                       |                              | 0536226-0982152 | 0538340-0981770 | 0536584-0976500 | 0539137-0978302 | 0529754-0981600 |
| Grouping                                                              | Analyte                      |                 |                 |                 |                 |                 |
| <b>SOIL</b>                                                           |                              |                 |                 |                 |                 |                 |
| <b>Physical Tests</b>                                                 | % Moisture (%)               |                 |                 |                 |                 |                 |
|                                                                       | pH (pH)                      | 4.73            | 4.38            | 4.78            | 4.73            | 5.36            |
| <b>Metals</b>                                                         | Aluminum (Al) (mg/kg)        | 35500           | 26300           | 60600           | 46800           | 34100           |
|                                                                       | Antimony (Sb) (mg/kg)        | <10             | <10             | <10             | <10             | <10             |
|                                                                       | Arsenic (As) (mg/kg)         | <5.0            | <5.0            | <5.0            | <5.0            | <5.0            |
|                                                                       | Barium (Ba) (mg/kg)          | 57.8            | 10.9            | 19.9            | 76.6            | 59.2            |
|                                                                       | Beryllium (Be) (mg/kg)       | <0.50           | <0.50           | <0.50           | <0.50           | <0.50           |
|                                                                       | Bismuth (Bi) (mg/kg)         | <20             | <20             | <20             | <20             | <20             |
|                                                                       | Boron (B) (mg/kg)            | <10             | <10             | 14              | 12              | <10             |
|                                                                       | Cadmium (Cd) (mg/kg)         | <0.50           | <0.50           | 1.16            | 1.25            | 0.57            |
|                                                                       | Calcium (Ca) (mg/kg)         | 624             | 196             | 93              | <50             | 763             |
|                                                                       | Chromium (Cr) (mg/kg)        | 15.7            | 22.1            | 292             | 462             | 19.8            |
|                                                                       | Cobalt (Co) (mg/kg)          | 10.7            | <2.0            | 11.3            | 47.2            | 15.4            |
|                                                                       | Copper (Cu) (mg/kg)          | 154             | 50.8            | 203             | 649             | 252             |
|                                                                       | Iron (Fe) (mg/kg)            | 34000           | 25700           | 126000          | 118000          | 50800           |
|                                                                       | Lead (Pb) (mg/kg)            | <30             | <30             | <30             | <30             | <30             |
|                                                                       | Lithium (Li) (mg/kg)         | 3.7             | <2.0            | 4.9             | 4.4             | 7.2             |
|                                                                       | Magnesium (Mg) (mg/kg)       | 1390            | 496             | 407             | 517             | 1740            |
|                                                                       | Manganese (Mn) (mg/kg)       | 950             | 63.1            | 239             | 2000            | 1510            |
|                                                                       | Mercury (Hg) (mg/kg)         | 0.111           | 0.120           | 0.157           | 0.147           | 0.153           |
|                                                                       | Molybdenum (Mo) (mg/kg)      | <4.0            | <4.0            | <4.0            | <4.0            | 8.3             |
|                                                                       | Nickel (Ni) (mg/kg)          | <5.0            | 5.7             | 20.1            | 26.3            | <5.0            |
|                                                                       | Phosphorus (P) (mg/kg)       | 426             | 153             | 357             | 303             | 629             |
|                                                                       | Potassium (K) (mg/kg)        | 270             | <200            | <200            | <200            | 800             |
|                                                                       | Selenium (Se) (mg/kg)        | <3.0            | <2.0            | <5.0            | <7.0            | <2.0            |
|                                                                       | Silver (Ag) (mg/kg)          | <2.0            | <2.0            | <2.0            | <2.0            | <2.0            |
|                                                                       | Sodium (Na) (mg/kg)          | <200            | <200            | <200            | <200            | <200            |
|                                                                       | Strontium (Sr) (mg/kg)       | 10.4            | 4.43            | 2.13            | 2.02            | 11.1            |
|                                                                       | Thallium (Tl) (mg/kg)        | <1.0            | <1.0            | <1.0            | <1.0            | <1.0            |
|                                                                       | Tin (Sn) (mg/kg)             | <5.0            | <5.0            | <5.0            | <5.0            | <5.0            |
|                                                                       | Titanium (Ti) (mg/kg)        | 251             | 191             | 342             | 521             | 116             |
|                                                                       | Vanadium (V) (mg/kg)         | 104             | 82.6            | 457             | 389             | 149             |
|                                                                       | Zinc (Zn) (mg/kg)            | 41.3            | 8.1             | 31.4            | 50.2            | 80.4            |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | Acenaphthylene (mg/kg)       |                 |                 |                 |                 |                 |
|                                                                       | Anthracene (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | Benz(a)anthracene (mg/kg)    |                 |                 |                 |                 |                 |
|                                                                       | Benzo(a)pyrene (mg/kg)       |                 |                 |                 |                 |                 |
|                                                                       | Benzo(b)fluoranthene (mg/kg) |                 |                 |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                              | L720815-6       | L720815-7       | L720815-8       | L720815-9       | L720815-10      |
|-----------------------------------------------------------------------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                                       |                              | 05-OCT-08       | 05-OCT-08       | 06-OCT-08       | 06-OCT-08       | 04-OCT-08       |
|                                                                       |                              | 0536353-0987255 | 0533588-0996774 | 0534485-0976630 | 0536450-0978838 | 0538538-0980036 |
| Grouping                                                              | Analyte                      |                 |                 |                 |                 |                 |
| <b>SOIL</b>                                                           |                              |                 |                 |                 |                 |                 |
| <b>Physical Tests</b>                                                 | % Moisture (%)               |                 |                 |                 |                 |                 |
|                                                                       | pH (pH)                      | 4.61            | 5.00            | 4.37            | 5.49            | 4.93            |
| <b>Metals</b>                                                         | Aluminum (Al) (mg/kg)        | 16400           | 13800           | 29200           | 35200           | 25200           |
|                                                                       | Antimony (Sb) (mg/kg)        | <10             | <10             | <10             | <10             | <10             |
|                                                                       | Arsenic (As) (mg/kg)         | <5.0            | <5.0            | <5.0            | <5.0            | <5.0            |
|                                                                       | Barium (Ba) (mg/kg)          | 10.3            | 5.8             | 31.4            | 141             | 29.2            |
|                                                                       | Beryllium (Be) (mg/kg)       | <0.50           | <0.50           | <0.50           | <0.50           | <0.50           |
|                                                                       | Bismuth (Bi) (mg/kg)         | <20             | <20             | <20             | <20             | <20             |
|                                                                       | Boron (B) (mg/kg)            | <10             | <10             | <10             | <10             | <10             |
|                                                                       | Cadmium (Cd) (mg/kg)         | <0.50           | <0.50           | <0.50           | 1.09            | <0.50           |
|                                                                       | Calcium (Ca) (mg/kg)         | 139             | 156             | <50             | 1310            | 86              |
|                                                                       | Chromium (Cr) (mg/kg)        | 4.5             | 2.3             | 45.5            | 51.7            | <2.0            |
|                                                                       | Cobalt (Co) (mg/kg)          | <2.0            | <2.0            | <2.0            | 25.2            | <2.0            |
|                                                                       | Copper (Cu) (mg/kg)          | 19.7            | 11.3            | 183             | 586             | 24.4            |
|                                                                       | Iron (Fe) (mg/kg)            | 9020            | 5050            | 57700           | 55900           | 30900           |
|                                                                       | Lead (Pb) (mg/kg)            | <30             | <30             | <30             | <30             | <30             |
|                                                                       | Lithium (Li) (mg/kg)         | <2.0            | <2.0            | 3.1             | 9.1             | <2.0            |
|                                                                       | Magnesium (Mg) (mg/kg)       | 273             | 191             | 378             | 4730            | 586             |
|                                                                       | Manganese (Mn) (mg/kg)       | 109             | 22.3            | 24.8            | 1990            | 227             |
|                                                                       | Mercury (Hg) (mg/kg)         | 0.0816          | 0.0759          | 0.180           | 0.0556          | 0.0645          |
|                                                                       | Molybdenum (Mo) (mg/kg)      | <4.0            | 4.1             | 13.1            | 9.8             | <4.0            |
|                                                                       | Nickel (Ni) (mg/kg)          | <5.0            | <5.0            | 5.3             | 10.7            | <5.0            |
|                                                                       | Phosphorus (P) (mg/kg)       | 171             | 148             | 214             | 441             | 94              |
|                                                                       | Potassium (K) (mg/kg)        | <200            | <200            | 720             | 550             | <200            |
|                                                                       | Selenium (Se) (mg/kg)        | <2.0            | <2.0            | <6.0            | <2.0            | <3.0            |
|                                                                       | Silver (Ag) (mg/kg)          | <2.0            | <2.0            | <2.0            | <2.0            | <2.0            |
|                                                                       | Sodium (Na) (mg/kg)          | <200            | <200            | <200            | <200            | <200            |
|                                                                       | Strontium (Sr) (mg/kg)       | 2.83            | 4.21            | 7.40            | 18.0            | 4.65            |
|                                                                       | Thallium (Tl) (mg/kg)        | <1.0            | <1.0            | <1.0            | <1.0            | <1.0            |
|                                                                       | Tin (Sn) (mg/kg)             | <5.0            | <5.0            | <5.0            | <5.0            | <5.0            |
|                                                                       | Titanium (Ti) (mg/kg)        | 429             | 563             | 53.9            | 479             | 403             |
|                                                                       | Vanadium (V) (mg/kg)         | 55.6            | 44.5            | 192             | 171             | 54.4            |
|                                                                       | Zinc (Zn) (mg/kg)            | 11.5            | 4.6             | 15.1            | 217             | 23.1            |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Acenaphthene (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | Acenaphthylene (mg/kg)       |                 |                 |                 |                 |                 |
|                                                                       | Anthracene (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | Benz(a)anthracene (mg/kg)    |                 |                 |                 |                 |                 |
|                                                                       | Benzo(a)pyrene (mg/kg)       |                 |                 |                 |                 |                 |
|                                                                       | Benzo(b)fluoranthene (mg/kg) |                 |                 |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                              | Sample ID       |  |                 |  |  |
|-----------------------------------------|------------------------------|-----------------|--|-----------------|--|--|
|                                         |                              | Description     |  |                 |  |  |
|                                         |                              | Sampled Date    |  |                 |  |  |
|                                         |                              | Sampled Time    |  |                 |  |  |
|                                         |                              | Client ID       |  |                 |  |  |
|                                         |                              | L720815-17      |  | L720815-20      |  |  |
|                                         |                              | 04-OCT-08       |  | 06-OCT-08       |  |  |
|                                         |                              | 0539137-0978302 |  | 0534485-0976630 |  |  |
| Grouping                                | Analyte                      |                 |  |                 |  |  |
| <b>SOIL</b>                             |                              |                 |  |                 |  |  |
| <b>Physical Tests</b>                   | % Moisture (%)               | 44.9            |  | 47.5            |  |  |
|                                         | pH (pH)                      |                 |  |                 |  |  |
| <b>Metals</b>                           | Aluminum (Al) (mg/kg)        |                 |  |                 |  |  |
|                                         | Antimony (Sb) (mg/kg)        |                 |  |                 |  |  |
|                                         | Arsenic (As) (mg/kg)         |                 |  |                 |  |  |
|                                         | Barium (Ba) (mg/kg)          |                 |  |                 |  |  |
|                                         | Beryllium (Be) (mg/kg)       |                 |  |                 |  |  |
|                                         | Bismuth (Bi) (mg/kg)         |                 |  |                 |  |  |
|                                         | Boron (B) (mg/kg)            |                 |  |                 |  |  |
|                                         | Cadmium (Cd) (mg/kg)         |                 |  |                 |  |  |
|                                         | Calcium (Ca) (mg/kg)         |                 |  |                 |  |  |
|                                         | Chromium (Cr) (mg/kg)        |                 |  |                 |  |  |
|                                         | Cobalt (Co) (mg/kg)          |                 |  |                 |  |  |
|                                         | Copper (Cu) (mg/kg)          |                 |  |                 |  |  |
|                                         | Iron (Fe) (mg/kg)            |                 |  |                 |  |  |
|                                         | Lead (Pb) (mg/kg)            |                 |  |                 |  |  |
|                                         | Lithium (Li) (mg/kg)         |                 |  |                 |  |  |
|                                         | Magnesium (Mg) (mg/kg)       |                 |  |                 |  |  |
|                                         | Manganese (Mn) (mg/kg)       |                 |  |                 |  |  |
|                                         | Mercury (Hg) (mg/kg)         |                 |  |                 |  |  |
|                                         | Molybdenum (Mo) (mg/kg)      |                 |  |                 |  |  |
|                                         | Nickel (Ni) (mg/kg)          |                 |  |                 |  |  |
|                                         | Phosphorus (P) (mg/kg)       |                 |  |                 |  |  |
|                                         | Potassium (K) (mg/kg)        |                 |  |                 |  |  |
|                                         | Selenium (Se) (mg/kg)        |                 |  |                 |  |  |
|                                         | Silver (Ag) (mg/kg)          |                 |  |                 |  |  |
|                                         | Sodium (Na) (mg/kg)          |                 |  |                 |  |  |
|                                         | Strontium (Sr) (mg/kg)       |                 |  |                 |  |  |
|                                         | Thallium (Tl) (mg/kg)        |                 |  |                 |  |  |
|                                         | Tin (Sn) (mg/kg)             |                 |  |                 |  |  |
|                                         | Titanium (Ti) (mg/kg)        |                 |  |                 |  |  |
|                                         | Vanadium (V) (mg/kg)         |                 |  |                 |  |  |
|                                         | Zinc (Zn) (mg/kg)            |                 |  |                 |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Acenaphthene (mg/kg)         | <0.040          |  | <0.040          |  |  |
|                                         | Acenaphthylene (mg/kg)       | <0.050          |  | <0.050          |  |  |
|                                         | Anthracene (mg/kg)           | <0.050          |  | <0.050          |  |  |
|                                         | Benz(a)anthracene (mg/kg)    | <0.050          |  | <0.050          |  |  |
|                                         | Benzo(a)pyrene (mg/kg)       | <0.050          |  | <0.050          |  |  |
|                                         | Benzo(b)fluoranthene (mg/kg) | <0.050          |  | <0.050          |  |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                         | L720815-1       | L720815-2       | L720815-3       | L720815-4       | L720815-5       |
|-----------------------------------------------------------------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                                       |                                         | 05-OCT-08       | 06-OCT-08       | 04-OCT-08       | 04-OCT-08       | 07-OCT-08       |
|                                                                       |                                         | 0536226-0982152 | 0538340-0981770 | 0536584-0976500 | 0539137-0978302 | 0529754-0981600 |
| Grouping                                                              | Analyte                                 |                 |                 |                 |                 |                 |
| <b>SOIL</b>                                                           |                                         |                 |                 |                 |                 |                 |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Benzo(g,h,i)perylene (mg/kg)            |                 |                 |                 |                 |                 |
|                                                                       | Benzo(k)fluoranthene (mg/kg)            |                 |                 |                 |                 |                 |
|                                                                       | Chrysene (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | Fluoranthene (mg/kg)                    |                 |                 |                 |                 |                 |
|                                                                       | Fluorene (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | 2-Methylnaphthalene (mg/kg)             |                 |                 |                 |                 |                 |
|                                                                       | Naphthalene (mg/kg)                     |                 |                 |                 |                 |                 |
|                                                                       | Phenanthrene (mg/kg)                    |                 |                 |                 |                 |                 |
|                                                                       | Pyrene (mg/kg)                          |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)    |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)        |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)      |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)    |                 |                 |                 |                 |                 |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1221 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1232 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1242 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1248 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1254 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1260 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1262 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1268 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg) |                 |                 |                 |                 |                 |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                          |                 |                 |                 |                 |                 |
|                                                                       | alpha-BHC (mg/kg)                       |                 |                 |                 |                 |                 |
|                                                                       | beta-BHC (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Lindane (gamma - BHC) (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | delta-BHC (mg/kg)                       |                 |                 |                 |                 |                 |
|                                                                       | cis-Chlordane (alpha) (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | trans-Chlordane (gamma) (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDD (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDD (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDE (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDE (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDT (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDT (mg/kg)                        |                 |                 |                 |                 |                 |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                         | L720815-6       | L720815-7       | L720815-8       | L720815-9       | L720815-10      |
|-----------------------------------------------------------------------|-----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                                                       |                                         | 05-OCT-08       | 05-OCT-08       | 06-OCT-08       | 06-OCT-08       | 04-OCT-08       |
|                                                                       |                                         | 0536353-0987255 | 0533588-0996774 | 0534485-0976630 | 0536450-0978838 | 0538538-0980036 |
| Grouping                                                              | Analyte                                 |                 |                 |                 |                 |                 |
| <b>SOIL</b>                                                           |                                         |                 |                 |                 |                 |                 |
| <b>Polycyclic<br/>Aromatic<br/>Hydrocarbons</b>                       | Benzo(g,h,i)perylene (mg/kg)            |                 |                 |                 |                 |                 |
|                                                                       | Benzo(k)fluoranthene (mg/kg)            |                 |                 |                 |                 |                 |
|                                                                       | Chrysene (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Dibenz(a,h)anthracene (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | Fluoranthene (mg/kg)                    |                 |                 |                 |                 |                 |
|                                                                       | Fluorene (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Indeno(1,2,3-c,d)pyrene (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | 2-Methylnaphthalene (mg/kg)             |                 |                 |                 |                 |                 |
|                                                                       | Naphthalene (mg/kg)                     |                 |                 |                 |                 |                 |
|                                                                       | Phenanthrene (mg/kg)                    |                 |                 |                 |                 |                 |
|                                                                       | Pyrene (mg/kg)                          |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d10-Acenaphthene (SS) (%)    |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d12-Chrysene (SS) (%)        |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d8-Naphthalene (SS) (%)      |                 |                 |                 |                 |                 |
|                                                                       | Surrogate: d10-Phenanthrene (SS) (%)    |                 |                 |                 |                 |                 |
| <b>Polychlorinated<br/>Biphenyls</b>                                  | PCB-1016 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1221 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1232 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1242 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1248 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1254 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1260 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1262 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | PCB-1268 (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Total Polychlorinated Biphenyls (mg/kg) |                 |                 |                 |                 |                 |
| <b>Organochlorine<br/>Pesticides</b>                                  | Aldrin (mg/kg)                          |                 |                 |                 |                 |                 |
|                                                                       | alpha-BHC (mg/kg)                       |                 |                 |                 |                 |                 |
|                                                                       | beta-BHC (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | Lindane (gamma - BHC) (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | delta-BHC (mg/kg)                       |                 |                 |                 |                 |                 |
|                                                                       | cis-Chlordane (alpha) (mg/kg)           |                 |                 |                 |                 |                 |
|                                                                       | trans-Chlordane (gamma) (mg/kg)         |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDD (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDD (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDE (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDE (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 2,4'-DDT (mg/kg)                        |                 |                 |                 |                 |                 |
|                                                                       | 4,4'-DDT (mg/kg)                        |                 |                 |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                         |                                         | Sample ID    |         |  |  |  |
|-----------------------------------------|-----------------------------------------|--------------|---------|--|--|--|
|                                         |                                         | Description  |         |  |  |  |
|                                         |                                         | Sampled Date |         |  |  |  |
|                                         |                                         | Sampled Time |         |  |  |  |
|                                         |                                         | Client ID    |         |  |  |  |
| Grouping                                | Analyte                                 |              |         |  |  |  |
| <b>SOIL</b>                             |                                         |              |         |  |  |  |
| <b>Polycyclic Aromatic Hydrocarbons</b> | Benzo(g,h,i)perylene (mg/kg)            | <0.050       | <0.050  |  |  |  |
|                                         | Benzo(k)fluoranthene (mg/kg)            | <0.050       | <0.050  |  |  |  |
|                                         | Chrysene (mg/kg)                        | <0.050       | <0.050  |  |  |  |
|                                         | Dibenz(a,h)anthracene (mg/kg)           | <0.050       | <0.050  |  |  |  |
|                                         | Fluoranthene (mg/kg)                    | <0.050       | <0.050  |  |  |  |
|                                         | Fluorene (mg/kg)                        | <0.050       | <0.050  |  |  |  |
|                                         | Indeno(1,2,3-c,d)pyrene (mg/kg)         | <0.050       | <0.050  |  |  |  |
|                                         | 2-Methylnaphthalene (mg/kg)             | <0.050       | <0.050  |  |  |  |
|                                         | Naphthalene (mg/kg)                     | 0.197        | 0.239   |  |  |  |
|                                         | Phenanthrene (mg/kg)                    | <0.050       | <0.050  |  |  |  |
|                                         | Pyrene (mg/kg)                          | <0.050       | <0.050  |  |  |  |
|                                         | Surrogate: d10-Acenaphthene (SS) (%)    | 93           | 92      |  |  |  |
|                                         | Surrogate: d12-Chrysene (SS) (%)        | 97           | 93      |  |  |  |
|                                         | Surrogate: d8-Naphthalene (SS) (%)      | 93           | 92      |  |  |  |
|                                         | Surrogate: d10-Phenanthrene (SS) (%)    | 89           | 86      |  |  |  |
| <b>Polychlorinated Biphenyls</b>        | PCB-1016 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1221 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1232 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1242 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1248 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1254 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1260 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1262 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | PCB-1268 (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | Total Polychlorinated Biphenyls (mg/kg) | <0.0016      | <0.0015 |  |  |  |
| <b>Organochlorine Pesticides</b>        | Aldrin (mg/kg)                          | <0.0016      | <0.0015 |  |  |  |
|                                         | alpha-BHC (mg/kg)                       | <0.0016      | <0.0015 |  |  |  |
|                                         | beta-BHC (mg/kg)                        | <0.0020      | <0.0020 |  |  |  |
|                                         | Lindane (gamma - BHC) (mg/kg)           | <0.0016      | <0.0015 |  |  |  |
|                                         | delta-BHC (mg/kg)                       | <0.0016      | <0.0015 |  |  |  |
|                                         | cis-Chlordane (alpha) (mg/kg)           | <0.0016      | <0.0015 |  |  |  |
|                                         | trans-Chlordane (gamma) (mg/kg)         | <0.0016      | <0.0015 |  |  |  |
|                                         | 2,4'-DDD (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | 4,4'-DDD (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | 2,4'-DDE (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | 4,4'-DDE (mg/kg)                        | <0.0016      | <0.0015 |  |  |  |
|                                         | 2,4'-DDT (mg/kg)                        | <0.0020      | <0.0020 |  |  |  |
|                                         | 4,4'-DDT (mg/kg)                        | <0.0020      | <0.0020 |  |  |  |

ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                            | L720815-1       | L720815-2       | L720815-3       | L720815-4       | L720815-5 |
|-----------------------------------------------------------------------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------|
| 0536226-0982152                                                       |                            | 0538340-0981770 | 0536584-0976500 | 0539137-0978302 | 0529754-0981600 |           |
| Grouping                                                              | Analyte                    |                 |                 |                 |                 |           |
| SOIL                                                                  |                            |                 |                 |                 |                 |           |
| Organochlorine<br>Pesticides                                          | Dieldrin (mg/kg)           |                 |                 |                 |                 |           |
|                                                                       | Endosulfan I (mg/kg)       |                 |                 |                 |                 |           |
|                                                                       | Endosulfan II (mg/kg)      |                 |                 |                 |                 |           |
|                                                                       | Endosulfan Sulfate (mg/kg) |                 |                 |                 |                 |           |
|                                                                       | Endrin (mg/kg)             |                 |                 |                 |                 |           |
|                                                                       | Heptachlor (mg/kg)         |                 |                 |                 |                 |           |
|                                                                       | Heptachlor Epoxide (mg/kg) |                 |                 |                 |                 |           |
|                                                                       | Methoxychlor (mg/kg)       |                 |                 |                 |                 |           |
|                                                                       | Mirex (mg/kg)              |                 |                 |                 |                 |           |
|                                                                       | cis-Nonachlor (mg/kg)      |                 |                 |                 |                 |           |
|                                                                       | trans-Nonachlor (mg/kg)    |                 |                 |                 |                 |           |
|                                                                       | Oxychlorthane (mg/kg)      |                 |                 |                 |                 |           |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                            | Sample ID    | L720815-6       | L720815-7       | L720815-8       | L720815-9       | L720815-10      |
|--------------------------------------|----------------------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                                      |                            | Description  |                 |                 |                 |                 |                 |
|                                      |                            | Sampled Date | 05-OCT-08       | 05-OCT-08       | 06-OCT-08       | 06-OCT-08       | 04-OCT-08       |
|                                      |                            | Sampled Time |                 |                 |                 |                 |                 |
|                                      |                            | Client ID    | 0536353-0987255 | 0533588-0996774 | 0534485-0976630 | 0536450-0978838 | 0538538-0980036 |
| Grouping                             | Analyte                    |              |                 |                 |                 |                 |                 |
| <b>SOIL</b>                          |                            |              |                 |                 |                 |                 |                 |
| <b>Organochlorine<br/>Pesticides</b> | Dieldrin (mg/kg)           |              |                 |                 |                 |                 |                 |
|                                      | Endosulfan I (mg/kg)       |              |                 |                 |                 |                 |                 |
|                                      | Endosulfan II (mg/kg)      |              |                 |                 |                 |                 |                 |
|                                      | Endosulfan Sulfate (mg/kg) |              |                 |                 |                 |                 |                 |
|                                      | Endrin (mg/kg)             |              |                 |                 |                 |                 |                 |
|                                      | Heptachlor (mg/kg)         |              |                 |                 |                 |                 |                 |
|                                      | Heptachlor Epoxide (mg/kg) |              |                 |                 |                 |                 |                 |
|                                      | Methoxychlor (mg/kg)       |              |                 |                 |                 |                 |                 |
|                                      | Mirex (mg/kg)              |              |                 |                 |                 |                 |                 |
|                                      | cis-Nonachlor (mg/kg)      |              |                 |                 |                 |                 |                 |
|                                      | trans-Nonachlor (mg/kg)    |              |                 |                 |                 |                 |                 |
|                                      | Oxychlorthane (mg/kg)      |              |                 |                 |                 |                 |                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|                                      |                            | Sample ID    |         |  |  |  |
|--------------------------------------|----------------------------|--------------|---------|--|--|--|
|                                      |                            | Description  |         |  |  |  |
|                                      |                            | Sampled Date |         |  |  |  |
|                                      |                            | Sampled Time |         |  |  |  |
|                                      |                            | Client ID    |         |  |  |  |
| Grouping                             | Analyte                    |              |         |  |  |  |
| <b>SOIL</b>                          |                            |              |         |  |  |  |
| <b>Organochlorine<br/>Pesticides</b> | Dieldrin (mg/kg)           | <0.0020      | <0.0020 |  |  |  |
|                                      | Endosulfan I (mg/kg)       | <0.0016      | <0.0015 |  |  |  |
|                                      | Endosulfan II (mg/kg)      | <0.0016      | <0.0015 |  |  |  |
|                                      | Endosulfan Sulfate (mg/kg) | <0.0016      | <0.0015 |  |  |  |
|                                      | Endrin (mg/kg)             | <0.0050      | <0.0050 |  |  |  |
|                                      | Heptachlor (mg/kg)         | <0.0020      | <0.0020 |  |  |  |
|                                      | Heptachlor Epoxide (mg/kg) | <0.0016      | <0.0015 |  |  |  |
|                                      | Methoxychlor (mg/kg)       | <0.0050      | <0.0050 |  |  |  |
|                                      | Mirex (mg/kg)              | <0.0016      | <0.0015 |  |  |  |
|                                      | cis-Nonachlor (mg/kg)      | <0.0016      | <0.0015 |  |  |  |
|                                      | trans-Nonachlor (mg/kg)    | <0.0016      | <0.0015 |  |  |  |
|                                      | Oxychlorthane (mg/kg)      | <0.0016      | <0.0015 |  |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**HG-CCME-CVAFS-VA** Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

**MET-CSR-FULL-ICP-VA** Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

**MOISTURE-VA** Soil Moisture content ASTM METHOD D2974-00

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

**OCP1-SOX-ECD-VA** Soil OCP-1 in Soil by Soxhlet GCECD EPA METHODS 3540, 3545, 3610, 3630, 3660

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3545, 3610, 3630, 3660 & 8081, published by the United States Environmental Protection Agency (EPA). The procedure uses an automated system (Accelerated Solvent Extractor - ASE) at high temperature and pressure or a Soxhlet system to extract a subsample of the sediment/soil with dichloromethane. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): alumina clean-up, silica gel clean-up and/or sulphur clean-up. The final extract is analysed by dual capillary column gas chromatography with electron capture detection (GC/ECD).

**PAH-SURR-MS-VA** Soil PAH Surrogates for Soils EPA METHODS 3570, 3545A & 8270

**PAH-TUMB-H/A-MS-VA** Soil PAH by Tumbler HEX/ACE with GCMS EPA METHODS 3570 & 8270.

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3570 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a mechanical shaking technique to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

**PCB-SOX-ECD-VA** Soil PCBs in Soil by Soxhlet ECD EPA METHODS 3540, 3620, 3630, 3665, 8082

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3620, 3630, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a dichloromethane soxhlet extraction of a subsample of the sediment/soil which has been dried with anhydrous sodium sulphate. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): florisil clean-up, silica gel clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

**PH-1:2-VA** Soil CSR pH by 1:2 Water Leach BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

sieved (10 mesh /2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

|                     |      |                              |                          |
|---------------------|------|------------------------------|--------------------------|
| <b>TL-CSR-MS-VA</b> | Soil | ICPMS TI in Soil by CSR SALM | BCMELP CSR SALM Method 8 |
|---------------------|------|------------------------------|--------------------------|

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

### GLOSSARY OF REPORT TERMS

*Surr* - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Environmental Division

# ALS Laboratory Group Quality Control Report

Workorder: L720815

Report Date: 05-MAY-09

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Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: ADRIAN DE BRUYN

| Test                       | Matrix         | Reference              | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|---------|-----------|-------|-----|--------|-----------|
| <b>HG-CCME-CVAFS-VA</b>    |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R779210</b> |                        |         |           |       |     |        |           |
| <b>WG895934-4</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 104     |           | %     |     | 86-139 | 19-JAN-09 |
| <b>WG895934-5</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 105     |           | %     |     | 85-116 | 19-JAN-09 |
| <b>WG895934-3</b>          | <b>DUP</b>     | <b>L720815-8</b>       |         |           |       |     |        |           |
| Mercury (Hg)               |                | 0.180                  | 0.175   |           | mg/kg | 2.7 | 30     | 19-JAN-09 |
| <b>WG895934-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 19-JAN-09 |
| <b>WG895934-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 19-JAN-09 |
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R779368</b> |                        |         |           |       |     |        |           |
| <b>WG895934-4</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28      |           | %     |     | 27-28  | 19-JAN-09 |
| Arsenic (As)               |                |                        | 97      |           | %     |     | 83-117 | 19-JAN-09 |
| Barium (Ba)                |                |                        | 13      |           | %     |     | 11-14  | 19-JAN-09 |
| Beryllium (Be)             |                |                        | 23      | RM-H      | %     |     | 18-22  | 19-JAN-09 |
| Calcium (Ca)               |                |                        | 21      |           | %     |     | 12-22  | 19-JAN-09 |
| Chromium (Cr)              |                |                        | 44      |           | %     |     | 39-50  | 19-JAN-09 |
| Cobalt (Co)                |                |                        | 74      |           | %     |     | 67-77  | 19-JAN-09 |
| Copper (Cu)                |                |                        | 107     |           | %     |     | 93-112 | 19-JAN-09 |
| Iron (Fe)                  |                |                        | 75      |           | %     |     | 51-86  | 19-JAN-09 |
| Magnesium (Mg)             |                |                        | 52      |           | %     |     | 47-54  | 19-JAN-09 |
| Manganese (Mn)             |                |                        | 86      |           | %     |     | 75-89  | 19-JAN-09 |
| Nickel (Ni)                |                |                        | 67      |           | %     |     | 59-95  | 19-JAN-09 |
| Phosphorus (P)             |                |                        | 93      |           | %     |     | 84-101 | 19-JAN-09 |
| Potassium (K)              |                |                        | 4       |           | %     |     | 2-4    | 19-JAN-09 |
| Sodium (Na)                |                |                        | 2       |           | %     |     | 1-2    | 19-JAN-09 |
| Strontium (Sr)             |                |                        | 4       |           | %     |     | 3-4    | 19-JAN-09 |
| Titanium (Ti)              |                |                        | 15      | RM-H      | %     |     | 7-13   | 19-JAN-09 |
| Vanadium (V)               |                |                        | 63      |           | %     |     | 53-68  | 19-JAN-09 |
| Zinc (Zn)                  |                |                        | 73      |           | %     |     | 66-81  | 19-JAN-09 |
| <b>WG895934-5</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 30      |           | %     |     | 23-32  | 19-JAN-09 |
| Arsenic (As)               |                |                        | 94      |           | %     |     | 91-115 | 19-JAN-09 |
| Beryllium (Be)             |                |                        | 18      |           | %     |     | 10-20  | 19-JAN-09 |



# ALS Laboratory Group Quality Control Report

Workorder: L720815

Report Date: 05-MAY-09

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| Test                       | Matrix         | Reference           | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|---------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>         |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R779368</b> |                     |        |           |       |     |        |           |
| <b>WG895934-5</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b> |        |           |       |     |        |           |
| Cadmium (Cd)               |                |                     | 119    |           | %     |     | 80-148 | 19-JAN-09 |
| Calcium (Ca)               |                |                     | 44     |           | %     |     | 36-48  | 19-JAN-09 |
| Chromium (Cr)              |                |                     | 54     |           | %     |     | 52-58  | 19-JAN-09 |
| Cobalt (Co)                |                |                     | 76     |           | %     |     | 70-79  | 19-JAN-09 |
| Copper (Cu)                |                |                     | 104    |           | %     |     | 95-115 | 19-JAN-09 |
| Iron (Fe)                  |                |                     | 81     |           | %     |     | 74-86  | 19-JAN-09 |
| Lead (Pb)                  |                |                     | 97     |           | %     |     | 85-109 | 19-JAN-09 |
| Lithium (Li)               |                |                     | 83     |           | %     |     | 65-95  | 19-JAN-09 |
| Magnesium (Mg)             |                |                     | 74     |           | %     |     | 69-80  | 19-JAN-09 |
| Manganese (Mn)             |                |                     | 61     |           | %     |     | 58-65  | 19-JAN-09 |
| Nickel (Ni)                |                |                     | 78     |           | %     |     | 74-88  | 19-JAN-09 |
| Phosphorus (P)             |                |                     | 91     |           | %     |     | 83-118 | 19-JAN-09 |
| Potassium (K)              |                |                     | 27     |           | %     |     | 21-31  | 19-JAN-09 |
| Strontium (Sr)             |                |                     | 25     |           | %     |     | 20-30  | 19-JAN-09 |
| Tin (Sn)                   |                |                     | 105    |           | %     |     | 77-116 | 19-JAN-09 |
| Titanium (Ti)              |                |                     | 23     |           | %     |     | 18-26  | 19-JAN-09 |
| Vanadium (V)               |                |                     | 60     |           | %     |     | 56-64  | 19-JAN-09 |
| Zinc (Zn)                  |                |                     | 96     |           | %     |     | 89-107 | 19-JAN-09 |
| <b>WG895934-1</b>          | <b>MB</b>      |                     |        |           |       |     |        |           |
| Aluminum (Al)              |                |                     | <50    |           | mg/kg |     | 50     | 19-JAN-09 |
| Antimony (Sb)              |                |                     | <10    |           | mg/kg |     | 10     | 19-JAN-09 |
| Arsenic (As)               |                |                     | <5.0   |           | mg/kg |     | 5      | 19-JAN-09 |
| Barium (Ba)                |                |                     | <1.0   |           | mg/kg |     | 1      | 19-JAN-09 |
| Beryllium (Be)             |                |                     | <0.50  |           | mg/kg |     | 0.5    | 19-JAN-09 |
| Bismuth (Bi)               |                |                     | <20    |           | mg/kg |     | 20     | 19-JAN-09 |
| Cadmium (Cd)               |                |                     | <0.50  |           | mg/kg |     | 0.5    | 19-JAN-09 |
| Calcium (Ca)               |                |                     | <50    |           | mg/kg |     | 50     | 19-JAN-09 |
| Chromium (Cr)              |                |                     | <2.0   |           | mg/kg |     | 2      | 19-JAN-09 |
| Cobalt (Co)                |                |                     | <2.0   |           | mg/kg |     | 2      | 19-JAN-09 |
| Copper (Cu)                |                |                     | <1.0   |           | mg/kg |     | 1      | 19-JAN-09 |
| Iron (Fe)                  |                |                     | <50    |           | mg/kg |     | 50     | 19-JAN-09 |
| Lead (Pb)                  |                |                     | <30    |           | mg/kg |     | 30     | 19-JAN-09 |
| Lithium (Li)               |                |                     | <2.0   |           | mg/kg |     | 2      | 19-JAN-09 |
| Magnesium (Mg)             |                |                     | <50    |           | mg/kg |     | 50     | 19-JAN-09 |

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| Test                       | Matrix         | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-----------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> | <b>Soil</b>    |           |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R779368</b> |           |        |           |       |     |       |           |
| <b>WG895934-1 MB</b>       |                |           |        |           |       |     |       |           |
| Manganese (Mn)             |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Molybdenum (Mo)            |                |           | <4.0   |           | mg/kg |     | 4     | 19-JAN-09 |
| Nickel (Ni)                |                |           | <5.0   |           | mg/kg |     | 5     | 19-JAN-09 |
| Phosphorus (P)             |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Potassium (K)              |                |           | <200   |           | mg/kg |     | 200   | 19-JAN-09 |
| Selenium (Se)              |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Silver (Ag)                |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Sodium (Na)                |                |           | <200   |           | mg/kg |     | 200   | 19-JAN-09 |
| Strontium (Sr)             |                |           | <0.50  |           | mg/kg |     | 0.5   | 19-JAN-09 |
| Tin (Sn)                   |                |           | <5.0   |           | mg/kg |     | 5     | 19-JAN-09 |
| Titanium (Ti)              |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Vanadium (V)               |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Zinc (Zn)                  |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| <b>WG895934-2 MB</b>       |                |           |        |           |       |     |       |           |
| Aluminum (Al)              |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Antimony (Sb)              |                |           | <10    |           | mg/kg |     | 10    | 19-JAN-09 |
| Arsenic (As)               |                |           | <5.0   |           | mg/kg |     | 5     | 19-JAN-09 |
| Barium (Ba)                |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Beryllium (Be)             |                |           | <0.50  |           | mg/kg |     | 0.5   | 19-JAN-09 |
| Bismuth (Bi)               |                |           | <20    |           | mg/kg |     | 20    | 19-JAN-09 |
| Cadmium (Cd)               |                |           | <0.50  |           | mg/kg |     | 0.5   | 19-JAN-09 |
| Calcium (Ca)               |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Chromium (Cr)              |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Cobalt (Co)                |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Copper (Cu)                |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Iron (Fe)                  |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Lead (Pb)                  |                |           | <30    |           | mg/kg |     | 30    | 19-JAN-09 |
| Lithium (Li)               |                |           | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Magnesium (Mg)             |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Manganese (Mn)             |                |           | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Molybdenum (Mo)            |                |           | <4.0   |           | mg/kg |     | 4     | 19-JAN-09 |
| Nickel (Ni)                |                |           | <5.0   |           | mg/kg |     | 5     | 19-JAN-09 |
| Phosphorus (P)             |                |           | <50    |           | mg/kg |     | 50    | 19-JAN-09 |
| Potassium (K)              |                |           | <200   |           | mg/kg |     | 200   | 19-JAN-09 |

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| Test                       | Matrix | Reference        | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|--------|------------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |        | <b>Soil</b>      |        |           |       |     |       |           |
| <b>Batch R779368</b>       |        |                  |        |           |       |     |       |           |
| <b>WG895934-2 MB</b>       |        |                  |        |           |       |     |       |           |
| Selenium (Se)              |        |                  | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Silver (Ag)                |        |                  | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Sodium (Na)                |        |                  | <200   |           | mg/kg |     | 200   | 19-JAN-09 |
| Strontium (Sr)             |        |                  | <0.50  |           | mg/kg |     | 0.5   | 19-JAN-09 |
| Tin (Sn)                   |        |                  | <5.0   |           | mg/kg |     | 5     | 19-JAN-09 |
| Titanium (Ti)              |        |                  | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| Vanadium (V)               |        |                  | <2.0   |           | mg/kg |     | 2     | 19-JAN-09 |
| Zinc (Zn)                  |        |                  | <1.0   |           | mg/kg |     | 1     | 19-JAN-09 |
| <b>Batch R780211</b>       |        |                  |        |           |       |     |       |           |
| <b>WG895934-3 DUP</b>      |        | <b>L720815-8</b> |        |           |       |     |       |           |
| Aluminum (Al)              |        | 29200            | 28800  |           | mg/kg | 1.3 | 30    | 21-JAN-09 |
| Antimony (Sb)              |        | <10              | <10    | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Arsenic (As)               |        | <5.0             | <5.0   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Barium (Ba)                |        | 31.4             | 34.1   |           | mg/kg | 8.3 | 30    | 21-JAN-09 |
| Beryllium (Be)             |        | <0.50            | <0.50  | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Bismuth (Bi)               |        | <20              | <20    | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Cadmium (Cd)               |        | <0.50            | <0.50  | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Calcium (Ca)               |        | <50              | <50    | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Chromium (Cr)              |        | 45.5             | 39.0   |           | mg/kg | 16  | 30    | 21-JAN-09 |
| Cobalt (Co)                |        | <2.0             | <2.0   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Copper (Cu)                |        | 183              | 174    |           | mg/kg | 4.8 | 30    | 21-JAN-09 |
| Iron (Fe)                  |        | 57700            | 52800  |           | mg/kg | 8.9 | 30    | 21-JAN-09 |
| Lead (Pb)                  |        | <30              | <30    | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Lithium (Li)               |        | 3.1              | 3.1    | J         | mg/kg | 0.1 | 8     | 21-JAN-09 |
| Magnesium (Mg)             |        | 378              | 411    | J         | mg/kg | 32  | 200   | 21-JAN-09 |
| Manganese (Mn)             |        | 24.8             | 24.4   |           | mg/kg | 1.2 | 30    | 21-JAN-09 |
| Molybdenum (Mo)            |        | 13.1             | 11.7   | J         | mg/kg | 1.3 | 16    | 21-JAN-09 |
| Nickel (Ni)                |        | 5.3              | <5.0   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Phosphorus (P)             |        | 214              | 184    | J         | mg/kg | 30  | 200   | 21-JAN-09 |
| Potassium (K)              |        | 720              | 850    | J         | mg/kg | 130 | 800   | 21-JAN-09 |
| Selenium (Se)              |        | <6.0             | <6.0   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Silver (Ag)                |        | <2.0             | <2.0   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Sodium (Na)                |        | <200             | <200   | RPD-NA    | mg/kg | N/A | 30    | 21-JAN-09 |
| Strontium (Sr)             |        | 7.40             | 7.84   |           | mg/kg | 5.8 | 30    | 21-JAN-09 |

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| Test                       | Matrix         | Reference        | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------|---------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>      |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R780211</b> |                  |         |           |       |     |        |           |
| <b>WG895934-3</b>          | <b>DUP</b>     | <b>L720815-8</b> |         |           |       |     |        |           |
| Tin (Sn)                   |                | <5.0             | <5.0    | RPD-NA    | mg/kg | N/A | 30     | 21-JAN-09 |
| Titanium (Ti)              |                | 53.9             | 57.8    |           | mg/kg | 6.9 | 30     | 21-JAN-09 |
| Vanadium (V)               |                | 192              | 163     |           | mg/kg | 16  | 30     | 21-JAN-09 |
| Zinc (Zn)                  |                | 15.1             | 10.7    | DUP-H     | mg/kg | 34  | 30     | 21-JAN-09 |
| <b>OCP1-SOX-ECD-VA</b>     |                | <b>Soil</b>      |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R780615</b> |                  |         |           |       |     |        |           |
| <b>WG896643-2</b>          | <b>LCS</b>     |                  |         |           |       |     |        |           |
| alpha-BHC                  |                |                  | 92      |           | %     |     | 55-145 | 21-JAN-09 |
| Lindane (gamma - BHC)      |                |                  | 90      |           | %     |     | 55-145 | 21-JAN-09 |
| beta-BHC                   |                |                  | 97      |           | %     |     | 55-145 | 21-JAN-09 |
| delta-BHC                  |                |                  | 91      |           | %     |     | 55-145 | 21-JAN-09 |
| Heptachlor                 |                |                  | 97      |           | %     |     | 55-145 | 21-JAN-09 |
| Aldrin                     |                |                  | 95      |           | %     |     | 55-145 | 21-JAN-09 |
| Oxychlordane               |                |                  | 98      |           | %     |     | 55-145 | 21-JAN-09 |
| 2,4'-DDE                   |                |                  | 115     |           | %     |     | 55-145 | 21-JAN-09 |
| Heptachlor Epoxide         |                |                  | 88      |           | %     |     | 55-145 | 21-JAN-09 |
| trans-Chlordane (gamma)    |                |                  | 98      |           | %     |     | 55-145 | 21-JAN-09 |
| trans-Nonachlor            |                |                  | 94      |           | %     |     | 55-145 | 21-JAN-09 |
| cis-Chlordane (alpha)      |                |                  | 101     |           | %     |     | 55-145 | 21-JAN-09 |
| 4,4'-DDE                   |                |                  | 101     |           | %     |     | 55-145 | 21-JAN-09 |
| Endosulfan I               |                |                  | 89      |           | %     |     | 55-145 | 21-JAN-09 |
| 2,4'-DDD                   |                |                  | 101     |           | %     |     | 55-145 | 21-JAN-09 |
| Dieldrin                   |                |                  | 86      |           | %     |     | 55-145 | 21-JAN-09 |
| 2,4'-DDT                   |                |                  | 101     |           | %     |     | 55-145 | 21-JAN-09 |
| Endrin                     |                |                  | 97      |           | %     |     | 55-145 | 21-JAN-09 |
| cis-Nonachlor              |                |                  | 100     |           | %     |     | 55-145 | 21-JAN-09 |
| 4,4'-DDD                   |                |                  | 99      |           | %     |     | 55-145 | 21-JAN-09 |
| Endosulfan II              |                |                  | 85      |           | %     |     | 55-145 | 21-JAN-09 |
| 4,4'-DDT                   |                |                  | 97      |           | %     |     | 55-145 | 21-JAN-09 |
| Methoxychlor               |                |                  | 102     |           | %     |     | 55-145 | 21-JAN-09 |
| Mirex                      |                |                  | 100     |           | %     |     | 55-145 | 21-JAN-09 |
| Endosulfan Sulfate         |                |                  | 88      |           | %     |     | 55-145 | 21-JAN-09 |
| <b>WG896643-1</b>          | <b>MB</b>      |                  |         |           |       |     |        |           |
| alpha-BHC                  |                |                  | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |

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| Test                    | Matrix  | Reference   | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|-------------------------|---------|-------------|---------|-----------|-------|-----|--------|-----------|
| OCP1-SOX-ECD-VA         |         | Soil        |         |           |       |     |        |           |
| Batch                   | R780615 |             |         |           |       |     |        |           |
| WG896643-1              | MB      |             |         |           |       |     |        |           |
| Lindane (gamma - BHC)   |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| beta-BHC                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| delta-BHC               |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Heptachlor              |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Aldrin                  |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Oxychlordane            |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 2,4'-DDE                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Heptachlor Epoxide      |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| trans-Chlordane (gamma) |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| trans-Nonachlor         |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| cis-Chlordane (alpha)   |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 4,4'-DDE                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Endosulfan I            |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 2,4'-DDD                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Dieldrin                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 2,4'-DDT                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Endrin                  |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| cis-Nonachlor           |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 4,4'-DDD                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Endosulfan II           |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| 4,4'-DDT                |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Methoxychlor            |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Mirex                   |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| Endosulfan Sulfate      |         |             | <0.0010 |           | mg/kg |     | 0.001  | 21-JAN-09 |
| PAH-TUMB-H/A-MS-VA      |         | Soil        |         |           |       |     |        |           |
| Batch                   | R779435 |             |         |           |       |     |        |           |
| WG895942-4              | IRM     | ALS PAH1 RM |         |           |       |     |        |           |
| Acenaphthene            |         |             | 93      |           | %     |     | 70-130 | 19-JAN-09 |
| Acenaphthylene          |         |             | 107     |           | %     |     | 70-130 | 19-JAN-09 |
| Anthracene              |         |             | 102     |           | %     |     | 70-130 | 19-JAN-09 |
| Benz(a)anthracene       |         |             | 104     |           | %     |     | 70-130 | 19-JAN-09 |
| Benzo(a)pyrene          |         |             | 93      |           | %     |     | 70-130 | 19-JAN-09 |
| Benzo(b)fluoranthene    |         |             | 102     |           | %     |     | 70-130 | 19-JAN-09 |
| Benzo(g,h,i)perylene    |         |             | 86      |           | %     |     | 70-130 | 19-JAN-09 |

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| Test                            | Matrix         | Reference          | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|---------------------------------|----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| <b>PAH-TUMB-H/A-MS-VA</b>       |                | <b>Soil</b>        |        |           |       |     |        |           |
| <b>Batch</b>                    | <b>R779435</b> |                    |        |           |       |     |        |           |
| <b>WG895942-4</b>               | <b>IRM</b>     | <b>ALS PAH1 RM</b> |        |           |       |     |        |           |
| Benzo(g,h,i)perylene            |                |                    | 86     |           | %     |     | 70-130 | 19-JAN-09 |
| Benzo(k)fluoranthene            |                |                    | 101    |           | %     |     | 70-130 | 19-JAN-09 |
| Chrysene                        |                |                    | 104    |           | %     |     | 70-130 | 19-JAN-09 |
| Dibenz(a,h)anthracene           |                |                    | 103    |           | %     |     | 70-130 | 19-JAN-09 |
| Fluoranthene                    |                |                    | 99     |           | %     |     | 70-130 | 19-JAN-09 |
| Fluorene                        |                |                    | 88     |           | %     |     | 70-130 | 19-JAN-09 |
| Indeno(1,2,3-c,d)pyrene         |                |                    | 94     |           | %     |     | 70-130 | 19-JAN-09 |
| 2-Methylnaphthalene             |                |                    | 104    |           | %     |     | 70-130 | 19-JAN-09 |
| Naphthalene                     |                |                    | 98     |           | %     |     | 50-130 | 19-JAN-09 |
| Phenanthrene                    |                |                    | 100    |           | %     |     | 70-130 | 19-JAN-09 |
| Pyrene                          |                |                    | 98     |           | %     |     | 70-130 | 19-JAN-09 |
| <b>WG895942-1</b>               | <b>MB</b>      |                    |        |           |       |     |        |           |
| Acenaphthene                    |                |                    | <0.040 |           | mg/kg |     | 0.04   | 19-JAN-09 |
| Acenaphthylene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Anthracene                      |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Benz(a)anthracene               |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Benzo(a)pyrene                  |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Benzo(b)fluoranthene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Benzo(g,h,i)perylene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Benzo(k)fluoranthene            |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Chrysene                        |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Dibenz(a,h)anthracene           |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Fluoranthene                    |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Fluorene                        |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Indeno(1,2,3-c,d)pyrene         |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| 2-Methylnaphthalene             |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Naphthalene                     |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Phenanthrene                    |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| Pyrene                          |                |                    | <0.050 |           | mg/kg |     | 0.05   | 19-JAN-09 |
| <b>PCB-SOX-ECD-VA</b>           |                | <b>Soil</b>        |        |           |       |     |        |           |
| <b>Batch</b>                    | <b>R780615</b> |                    |        |           |       |     |        |           |
| <b>WG896643-1</b>               | <b>MB</b>      |                    |        |           |       |     |        |           |
| Total Polychlorinated Biphenyls |                |                    | <0.010 |           | mg/kg |     | 0.01   | 21-JAN-09 |
| PCB-1016                        |                |                    | <0.010 |           | mg/kg |     | 0.01   | 21-JAN-09 |

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| Test                  | Matrix         | Reference              | Result | Qualifier | Units | RPD  | Limit | Analyzed  |
|-----------------------|----------------|------------------------|--------|-----------|-------|------|-------|-----------|
| <b>PCB-SOX-ECD-VA</b> |                | <b>Soil</b>            |        |           |       |      |       |           |
| <b>Batch</b>          | <b>R780615</b> |                        |        |           |       |      |       |           |
| <b>WG896643-1</b>     | <b>MB</b>      |                        |        |           |       |      |       |           |
| PCB-1221              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1232              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1242              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1248              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1254              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1260              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1262              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| PCB-1268              |                |                        | <0.010 |           | mg/kg |      | 0.01  | 21-JAN-09 |
| <b>PH-1:2-VA</b>      |                | <b>Soil</b>            |        |           |       |      |       |           |
| <b>Batch</b>          | <b>R778392</b> |                        |        |           |       |      |       |           |
| <b>WG895934-3</b>     | <b>DUP</b>     | <b>L720815-8</b>       |        |           |       |      |       |           |
| pH                    |                | 4.37                   | 4.36   |           | pH    | 0.23 | 20    | 15-JAN-09 |
| <b>TL-CSR-MS-VA</b>   |                | <b>Soil</b>            |        |           |       |      |       |           |
| <b>Batch</b>          | <b>R779559</b> |                        |        |           |       |      |       |           |
| <b>WG895934-4</b>     | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |      |       |           |
| <b>WG895934-5</b>     | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |      |       |           |
| <b>WG895934-3</b>     | <b>DUP</b>     | <b>L720815-8</b>       |        |           |       |      |       |           |
| Thallium (Tl)         |                | <1.0                   | <1.0   | RPD-NA    | mg/kg | N/A  | 30    | 19-JAN-09 |
| <b>WG895934-1</b>     | <b>MB</b>      |                        | <1.0   |           | mg/kg |      | 1     | 19-JAN-09 |
| Thallium (Tl)         |                |                        | <1.0   |           | mg/kg |      | 1     | 19-JAN-09 |
| <b>WG895934-2</b>     | <b>MB</b>      |                        | <1.0   |           | mg/kg |      | 1     | 19-JAN-09 |
| Thallium (Tl)         |                |                        | <1.0   |           | mg/kg |      | 1     | 19-JAN-09 |

## ALS Laboratory Group Quality Control Report

Workorder: L720815

Report Date: 05-MAY-09

Page 9 of 9

**Legend:**

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

**Sample Parameter Qualifier Definitions:**

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| Qualifier | Description                                                                                                                                          |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| DUP-H     | Duplicate results outside ALS DQO, due to sample heterogeneity.                                                                                      |
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                          |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                          |





|                                                                              |               |                                             |                    |                                                            |  |
|------------------------------------------------------------------------------|---------------|---------------------------------------------|--------------------|------------------------------------------------------------|--|
| <b>Report to:</b> <i>Solter - Laramie</i>                                    |               | <b>Report Format / Distribution</b>         |                    | <b>Service Requested:</b> (rush - subject to availability) |  |
| <b>Company:</b>                                                              |               | Standard: _____ Other: _____                |                    | Regular (Default)                                          |  |
| <b>Contact:</b>                                                              |               | Select: PDF _____ Excel _____ Digital _____ |                    | Priority (2-3 Business Days) - 50% Surcharge               |  |
| <b>Address:</b>                                                              |               | Email 1: _____                              |                    | Emergency (1 Business Day) - 100% Surcharge                |  |
| <b>Phone:</b>                                                                |               | Email 2: _____                              |                    | For Emergency < 1 Day, ASAP or Weekend - Contact ALS       |  |
| <b>Invoice To:</b> Same as Report? Yes / No?                                 |               | <b>Client / Project Information:</b>        |                    | <b>Analysis Request</b>                                    |  |
| <b>Company:</b>                                                              |               | Job #: <i>01-1334-0018</i>                  |                    | (Indicate Filtered or Preserved, F/P)                      |  |
| <b>Contact:</b>                                                              |               | PO / A/E:                                   |                    |                                                            |  |
| <b>Address:</b>                                                              |               | Legal Site Description:                     |                    |                                                            |  |
| <b>Phone:</b>                                                                |               | Quote #:                                    |                    |                                                            |  |
| <b>Lab Work Order #</b><br>(lab use only) <i>L720815</i>                     |               | <b>ALS Contact:</b>                         |                    |                                                            |  |
| <b>Sample Identification</b><br>(This description will appear on the report) |               | <b>Sampler:</b>                             |                    |                                                            |  |
| <b>Sample #</b>                                                              | <b>Date</b>   | <b>Time</b>                                 | <b>Sample Type</b> |                                                            |  |
| <i>0538226 - 0982152</i>                                                     | <i>045-08</i> |                                             |                    |                                                            |  |
| <i>0538340 - 0981770</i>                                                     | <i>046-08</i> |                                             |                    |                                                            |  |
| <i>0536584 - 0976500</i>                                                     | <i>044-08</i> |                                             |                    |                                                            |  |
| <i>0539137 - 0978302</i>                                                     | <i>044-08</i> |                                             |                    |                                                            |  |
| <i>0521754 - 0981600</i>                                                     | <i>047-08</i> |                                             |                    |                                                            |  |
| <i>0536353 - 0987255</i>                                                     | <i>045-08</i> |                                             |                    |                                                            |  |
| <i>0533588 - 0996774</i>                                                     | <i>"</i>      |                                             |                    |                                                            |  |
| <i>0534485 - 0976630</i>                                                     | <i>046-08</i> |                                             |                    |                                                            |  |
| <i>0536150 - 0978858</i>                                                     |               |                                             |                    |                                                            |  |
| <i>0538538 - 0980036</i>                                                     | <i>044/08</i> |                                             |                    |                                                            |  |
| <i>0536584 - 0976500</i>                                                     | <i>044/08</i> |                                             |                    |                                                            |  |
| <i>0533588 - 0996774</i>                                                     | <i>045/08</i> |                                             |                    |                                                            |  |

Special Instructions / Regulations / Hazardous Details

# SAMPLES RECEIVED WITHOUT COC

|                                      |                         |                                          |                         |                                                         |                     |
|--------------------------------------|-------------------------|------------------------------------------|-------------------------|---------------------------------------------------------|---------------------|
| <b>SHIPMENT RELEASE (client use)</b> |                         | <b>SHIPMENT RECEPTION (lab use only)</b> |                         | <b>SHIPMENT VERIFICATION (lab use only)</b>             |                     |
| <b>Released by:</b>                  | <b>Date &amp; Time:</b> | <b>Received by:</b>                      | <b>Date:</b>            | <b>Time:</b>                                            | <b>Temperature:</b> |
|                                      |                         | <i>[Signature]</i>                       | <i>8/10/23</i>          | <i>8:00</i>                                             | <i>5°C</i>          |
|                                      |                         | <b>Verified by:</b>                      | <b>Date &amp; Time:</b> | <b>Observations:</b><br>Yes / No ?<br>If Yes attach SIF |                     |
|                                      |                         |                                          |                         |                                                         |                     |

06664

GENF 18.00 Front

[illegible]

# SAMPLES RECEIVED WITHOUT COC

| SHIPMENT RELEASE (client use) |              | SHIPMENT RECEPTION (lab use only) |       | SHIPMENT VERIFICATION (lab use only) |                                                      |
|-------------------------------|--------------|-----------------------------------|-------|--------------------------------------|------------------------------------------------------|
| Released by:                  | Date & Time: | Received by:                      | Date: | Time:                                | Temperature:<br>Verified by: Date & Time:            |
|                               |              |                                   |       |                                      | Observations:<br>Yes / No ?<br><br>If Yes attach SIF |



Environmental Division

**Certificate of Analysis**

GOLDER ASSOCIATES LTD.  
ATTN: AUDREY WAGENAAR  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Report Date: 14-JUL-09 11:45 (MT)  
Version: FINAL

Lab Work Order #: **L780819**

Date Received: **19-JUN-09**

Project P.O. #:  
Job Reference:  
Legal Site Desc:  
CofC Numbers: C096971, C096972, C096973

Other Information:

Comments:

Amber Springer  
Account Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.  
ALL SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU  
REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                         | L780819-8                                    | L780819-9                                     | L780819-10                                    | L780819-11                                    | L780819-12                                   |
|-----------------------------------------------------------------------|-------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|----------------------------------------------|
|                                                                       |                         | 25-APR-09<br>08:20<br>SOIL 1 SAMPLES<br>8:20 | 25-APR-09<br>10:10<br>SOIL 1 SAMPLES<br>10:10 | 25-APR-09<br>11:20<br>SOIL 1 SAMPLES<br>11:20 | 25-APR-09<br>13:20<br>SOIL 1 SAMPLES<br>13:20 | 26-APR-09<br>08:40<br>SOIL 1 SAMPLES<br>8:40 |
| Grouping                                                              | Analyte                 |                                              |                                               |                                               |                                               |                                              |
| SOIL                                                                  |                         |                                              |                                               |                                               |                                               |                                              |
| Physical Tests                                                        | pH (pH)                 | 4.61                                         | 4.66                                          | 4.67                                          | 4.66                                          | 4.63                                         |
| Metals                                                                | Aluminum (Al) (mg/kg)   | 18400                                        | 30500                                         | 38900                                         | 37100                                         | 20800                                        |
|                                                                       | Antimony (Sb) (mg/kg)   | <10                                          | <10                                           | <10                                           | <10                                           | <10                                          |
|                                                                       | Arsenic (As) (mg/kg)    | <5.0                                         | <5.0                                          | <5.0                                          | <5.0                                          | <5.0                                         |
|                                                                       | Barium (Ba) (mg/kg)     | 8.3                                          | 39.1                                          | 199                                           | 30.8                                          | 123                                          |
|                                                                       | Beryllium (Be) (mg/kg)  | <0.50                                        | <0.50                                         | <0.50                                         | <0.50                                         | 0.98                                         |
|                                                                       | Bismuth (Bi) (mg/kg)    | <20                                          | <20                                           | <20                                           | <20                                           | <20                                          |
|                                                                       | Boron (B) (mg/kg)       | <10                                          | <10                                           | <10                                           | <10                                           | <10                                          |
|                                                                       | Cadmium (Cd) (mg/kg)    | <0.50                                        | <0.50                                         | 0.88                                          | 0.56                                          | <0.50                                        |
|                                                                       | Calcium (Ca) (mg/kg)    | 149                                          | 500                                           | 78                                            | 107                                           | <50                                          |
|                                                                       | Chromium (Cr) (mg/kg)   | 2.0                                          | 19.4                                          | 482                                           | 63.6                                          | 3.4                                          |
|                                                                       | Cobalt (Co) (mg/kg)     | <2.0                                         | 2.6                                           | 62.1                                          | 5.1                                           | 12.5                                         |
|                                                                       | Copper (Cu) (mg/kg)     | 14.5                                         | 157                                           | 467                                           | 857                                           | 1050                                         |
|                                                                       | Iron (Fe) (mg/kg)       | 6510                                         | 13900                                         | 110000                                        | 67300                                         | 69000                                        |
|                                                                       | Lead (Pb) (mg/kg)       | <30                                          | <30                                           | <30                                           | <30                                           | 56                                           |
|                                                                       | Lithium (Li) (mg/kg)    | <2.0                                         | 4.0                                           | 3.0                                           | 4.4                                           | <2.0                                         |
|                                                                       | Magnesium (Mg) (mg/kg)  | 261                                          | 1250                                          | 499                                           | 413                                           | 228                                          |
|                                                                       | Manganese (Mn) (mg/kg)  | 25.5                                         | 195                                           | 2610                                          | 44.3                                          | 838                                          |
|                                                                       | Mercury (Hg) (mg/kg)    | 0.110                                        | 0.105                                         | 0.178                                         | 0.117                                         | 0.0752                                       |
|                                                                       | Molybdenum (Mo) (mg/kg) | 4.2                                          | <4.0                                          | <4.0                                          | 167                                           | 493                                          |
|                                                                       | Nickel (Ni) (mg/kg)     | <5.0                                         | 5.2                                           | 23.5                                          | <5.0                                          | <5.0                                         |
|                                                                       | Phosphorus (P) (mg/kg)  | 184                                          | 407                                           | 299                                           | 397                                           | 944                                          |
|                                                                       | Potassium (K) (mg/kg)   | 210                                          | 250                                           | <200                                          | 770                                           | 1060                                         |
|                                                                       | Selenium (Se) (mg/kg)   | <2.0                                         | <3.0                                          | 2.69                                          | <3.0                                          | <2.0                                         |
|                                                                       | Silver (Ag) (mg/kg)     | <2.0                                         | <2.0                                          | <2.0                                          | <2.0                                          | 4.7                                          |
|                                                                       | Sodium (Na) (mg/kg)     | <200                                         | <200                                          | <200                                          | <200                                          | <200                                         |
|                                                                       | Strontium (Sr) (mg/kg)  | 5.14                                         | 6.75                                          | 1.99                                          | 8.49                                          | 8.21                                         |
|                                                                       | Thallium (Tl) (mg/kg)   | <1.0                                         | <1.0                                          | <1.0                                          | <1.0                                          | <1.0                                         |
|                                                                       | Tin (Sn) (mg/kg)        | <5.0                                         | <5.0                                          | <5.0                                          | <5.0                                          | <5.0                                         |
|                                                                       | Titanium (Ti) (mg/kg)   | 562                                          | 286                                           | 487                                           | 108                                           | 52.5                                         |
|                                                                       | Vanadium (V) (mg/kg)    | 54.8                                         | 67.1                                          | 366                                           | 186                                           | 53.1                                         |
|                                                                       | Zinc (Zn) (mg/kg)       | 5.6                                          | 34.0                                          | 34.7                                          | 10.5                                          | 86.3                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                         | L780819-13                                   | L780819-14                                    | L780819-15                                          | L780819-16                                           | L780819-17                                           |
|-----------------------------------------------------------------------|-------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------------|------------------------------------------------------|------------------------------------------------------|
|                                                                       |                         | 26-APR-09<br>09:15<br>SOIL 1 SAMPLES<br>9:15 | 26-APR-09<br>11:30<br>SOIL 1 SAMPLES<br>11:30 | 25-APR-09<br>08:20<br>LEAF LITTER 1<br>SAMPLES 8:20 | 25-APR-09<br>10:10<br>LEAF LITTER 1<br>SAMPLES 10:10 | 25-APR-09<br>11:20<br>LEAF LITTER 1<br>SAMPLES 11:20 |
| Grouping                                                              | Analyte                 |                                              |                                               |                                                     |                                                      |                                                      |
| SOIL                                                                  |                         |                                              |                                               |                                                     |                                                      |                                                      |
| Physical Tests                                                        | pH (pH)                 | 4.78                                         | 4.70                                          | 4.66                                                | 4.69                                                 | 4.58                                                 |
| Metals                                                                | Aluminum (Al) (mg/kg)   | 24900                                        | 41400                                         | 19600                                               | 34200                                                | 31300                                                |
|                                                                       | Antimony (Sb) (mg/kg)   | <10                                          | <10                                           | <10                                                 | <10                                                  | <10                                                  |
|                                                                       | Arsenic (As) (mg/kg)    | <5.0                                         | 5.5                                           | <5.0                                                | <5.0                                                 | <5.0                                                 |
|                                                                       | Barium (Ba) (mg/kg)     | 33.2                                         | 45.3                                          | 8.5                                                 | 78.2                                                 | 81.0                                                 |
|                                                                       | Beryllium (Be) (mg/kg)  | <0.50                                        | <0.50                                         | <0.50                                               | <0.50                                                | <0.50                                                |
|                                                                       | Bismuth (Bi) (mg/kg)    | <20                                          | <20                                           | <20                                                 | <20                                                  | <20                                                  |
|                                                                       | Boron (B) (mg/kg)       | <10                                          | <10                                           | <10                                                 | <10                                                  | <10                                                  |
|                                                                       | Cadmium (Cd) (mg/kg)    | <0.50                                        | 0.66                                          | <0.50                                               | <0.50                                                | <0.50                                                |
|                                                                       | Calcium (Ca) (mg/kg)    | 95                                           | <50                                           | 283                                                 | 1580                                                 | 1170                                                 |
|                                                                       | Chromium (Cr) (mg/kg)   | 19.8                                         | 147                                           | 3.1                                                 | 23.7                                                 | 232                                                  |
|                                                                       | Cobalt (Co) (mg/kg)     | <2.0                                         | <2.0                                          | <2.0                                                | 6.9                                                  | 29.8                                                 |
|                                                                       | Copper (Cu) (mg/kg)     | 590                                          | 120                                           | 15.3                                                | 278                                                  | 337                                                  |
|                                                                       | Iron (Fe) (mg/kg)       | 32700                                        | 98500                                         | 7130                                                | 18900                                                | 65300                                                |
|                                                                       | Lead (Pb) (mg/kg)       | <30                                          | <30                                           | <30                                                 | <30                                                  | <30                                                  |
|                                                                       | Lithium (Li) (mg/kg)    | 3.1                                          | 2.6                                           | <2.0                                                | 4.9                                                  | 2.3                                                  |
|                                                                       | Magnesium (Mg) (mg/kg)  | 767                                          | 560                                           | 330                                                 | 1800                                                 | 790                                                  |
|                                                                       | Manganese (Mn) (mg/kg)  | 95.5                                         | 474                                           | 28.5                                                | 526                                                  | 2080                                                 |
|                                                                       | Mercury (Hg) (mg/kg)    | 0.147                                        | 0.111                                         | 0.112                                               | 0.0698                                               | 0.130                                                |
|                                                                       | Molybdenum (Mo) (mg/kg) | 53.4                                         | <4.0                                          | 5.0                                                 | <4.0                                                 | <4.0                                                 |
|                                                                       | Nickel (Ni) (mg/kg)     | <5.0                                         | 9.5                                           | <5.0                                                | 8.4                                                  | 25.6                                                 |
|                                                                       | Phosphorus (P) (mg/kg)  | 404                                          | 313                                           | 198                                                 | 492                                                  | 416                                                  |
|                                                                       | Potassium (K) (mg/kg)   | 1010                                         | <200                                          | 230                                                 | 400                                                  | 360                                                  |
|                                                                       | Selenium (Se) (mg/kg)   | <3.0                                         | <3.0                                          | <2.0                                                | <2.0                                                 | <2.0                                                 |
|                                                                       | Silver (Ag) (mg/kg)     | <2.0                                         | <2.0                                          | <2.0                                                | <2.0                                                 | <2.0                                                 |
|                                                                       | Sodium (Na) (mg/kg)     | <200                                         | <200                                          | <200                                                | <200                                                 | <200                                                 |
|                                                                       | Strontium (Sr) (mg/kg)  | 6.43                                         | 2.01                                          | 6.60                                                | 16.5                                                 | 16.3                                                 |
|                                                                       | Thallium (Tl) (mg/kg)   | <1.0                                         | <1.0                                          | <1.0                                                | <1.0                                                 | <1.0                                                 |
|                                                                       | Tin (Sn) (mg/kg)        | <5.0                                         | <5.0                                          | <5.0                                                | <5.0                                                 | <5.0                                                 |
|                                                                       | Titanium (Ti) (mg/kg)   | 86.0                                         | 673                                           | 559                                                 | 337                                                  | 404                                                  |
|                                                                       | Vanadium (V) (mg/kg)    | 107                                          | 426                                           | 55.4                                                | 72.3                                                 | 220                                                  |
|                                                                       | Zinc (Zn) (mg/kg)       | 58.9                                         | 77.4                                          | 6.4                                                 | 44.8                                                 | 36.2                                                 |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                         | L780819-18                                           | L780819-19                                          | L780819-20                                          | L780819-21                                           |  |
|-----------------------------------------------------------------------|-------------------------|------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|------------------------------------------------------|--|
|                                                                       |                         | 25-APR-09<br>13:20<br>LEAF LITTER 1<br>SAMPLES 13:20 | 26-APR-09<br>08:40<br>LEAF LITTER 1<br>SAMPLES 8:40 | 26-APR-09<br>09:15<br>LEAF LITTER 1<br>SAMPLES 9:15 | 26-APR-09<br>11:30<br>LEAF LITTER 1<br>SAMPLES 11:30 |  |
| Grouping                                                              | Analyte                 |                                                      |                                                     |                                                     |                                                      |  |
| SOIL                                                                  |                         |                                                      |                                                     |                                                     |                                                      |  |
| Physical Tests                                                        | pH (pH)                 | 4.68                                                 | 5.19                                                | 4.58                                                | 4.63                                                 |  |
| Metals                                                                | Aluminum (Al) (mg/kg)   | 35900                                                | 8290                                                | 9970                                                | 16600                                                |  |
|                                                                       | Antimony (Sb) (mg/kg)   | <10                                                  | <10                                                 | <10                                                 | <10                                                  |  |
|                                                                       | Arsenic (As) (mg/kg)    | <5.0                                                 | <5.0                                                | <5.0                                                | <5.0                                                 |  |
|                                                                       | Barium (Ba) (mg/kg)     | 46.5                                                 | 22.2                                                | 93.0                                                | 21.0                                                 |  |
|                                                                       | Beryllium (Be) (mg/kg)  | <0.50                                                | <0.50                                               | <0.50                                               | <0.50                                                |  |
|                                                                       | Bismuth (Bi) (mg/kg)    | <20                                                  | <20                                                 | <20                                                 | <20                                                  |  |
|                                                                       | Boron (B) (mg/kg)       | <10                                                  | 17                                                  | <10                                                 | <10                                                  |  |
|                                                                       | Cadmium (Cd) (mg/kg)    | <0.50                                                | <0.50                                               | <0.50                                               | <0.50                                                |  |
|                                                                       | Calcium (Ca) (mg/kg)    | 1270                                                 | 4600                                                | 2350                                                | 1290                                                 |  |
|                                                                       | Chromium (Cr) (mg/kg)   | 36.3                                                 | <2.0                                                | <2.0                                                | 39.1                                                 |  |
|                                                                       | Cobalt (Co) (mg/kg)     | 3.2                                                  | <2.0                                                | 2.3                                                 | <2.0                                                 |  |
|                                                                       | Copper (Cu) (mg/kg)     | 668                                                  | 42.9                                                | 194                                                 | 45.3                                                 |  |
|                                                                       | Iron (Fe) (mg/kg)       | 49100                                                | 1490                                                | 14100                                               | 29000                                                |  |
|                                                                       | Lead (Pb) (mg/kg)       | <30                                                  | <30                                                 | <30                                                 | <30                                                  |  |
|                                                                       | Lithium (Li) (mg/kg)    | 2.4                                                  | <2.0                                                | <2.0                                                | <2.0                                                 |  |
|                                                                       | Magnesium (Mg) (mg/kg)  | 767                                                  | 1970                                                | 839                                                 | 852                                                  |  |
|                                                                       | Manganese (Mn) (mg/kg)  | 172                                                  | 261                                                 | 834                                                 | 306                                                  |  |
|                                                                       | Mercury (Hg) (mg/kg)    | 0.100                                                | 0.0802                                              | 0.0700                                              | 0.157                                                |  |
|                                                                       | Molybdenum (Mo) (mg/kg) | 19.9                                                 | 5.8                                                 | 186                                                 | <4.0                                                 |  |
|                                                                       | Nickel (Ni) (mg/kg)     | <5.0                                                 | <5.0                                                | <5.0                                                | <5.0                                                 |  |
|                                                                       | Phosphorus (P) (mg/kg)  | 620                                                  | 514                                                 | 452                                                 | 474                                                  |  |
|                                                                       | Potassium (K) (mg/kg)   | 880                                                  | 1100                                                | 950                                                 | 420                                                  |  |
|                                                                       | Selenium (Se) (mg/kg)   | 4.48                                                 | <2.0                                                | <2.0                                                | <2.0                                                 |  |
|                                                                       | Silver (Ag) (mg/kg)     | <2.0                                                 | <2.0                                                | <2.0                                                | <2.0                                                 |  |
|                                                                       | Sodium (Na) (mg/kg)     | <200                                                 | 230                                                 | <200                                                | <200                                                 |  |
|                                                                       | Strontium (Sr) (mg/kg)  | 36.3                                                 | 73.8                                                | 41.6                                                | 20.0                                                 |  |
|                                                                       | Thallium (Tl) (mg/kg)   | <1.0                                                 | <1.0                                                | <1.0                                                | <1.0                                                 |  |
|                                                                       | Tin (Sn) (mg/kg)        | <5.0                                                 | <5.0                                                | <5.0                                                | <5.0                                                 |  |
|                                                                       | Titanium (Ti) (mg/kg)   | 123                                                  | 10.4                                                | 29.0                                                | 255                                                  |  |
|                                                                       | Vanadium (V) (mg/kg)    | 177                                                  | 5.7                                                 | 17.5                                                | 129                                                  |  |
|                                                                       | Zinc (Zn) (mg/kg)       | 28.8                                                 | 15.4                                                | 23.7                                                | 47.9                                                 |  |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L780819-1                                                          | L780819-2                                                           | L780819-3                                                           | L780819-4                                                           | L780819-5                                                          |
|-----------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                       |                                   | 25-APR-09<br>08:20<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>8:20 | 25-APR-09<br>10:10<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>10:10 | 25-APR-09<br>11:20<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>11:20 | 25-APR-09<br>13:20<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>13:20 | 26-APR-09<br>08:40<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>8:40 |
| Grouping                                                              | Analyte                           |                                                                    |                                                                     |                                                                     |                                                                     |                                                                    |
| TISSUE                                                                |                                   |                                                                    |                                                                     |                                                                     |                                                                     |                                                                    |
| Physical Tests                                                        | % Moisture (%)                    | 73.3                                                               | 76.3                                                                | 79.4                                                                | 71.7                                                                | 76.0                                                               |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 19200                                                              | 27800                                                               | 19400                                                               | 26500                                                               | 16200                                                              |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 5140                                                               | 6580                                                                | 4010                                                                | 7490                                                                | 3880                                                               |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.25                                                              | <0.25                                                               | <0.25                                                               | <0.25                                                               | <0.25                                                              |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.050                                                             | <0.050                                                              | <0.050                                                              | <0.050                                                              | <0.050                                                             |
|                                                                       | Arsenic (As)-Total (mg/kg)        | 1.55                                                               | 0.76                                                                | 0.68                                                                | 1.19                                                                | 1.59                                                               |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | 0.414                                                              | 0.181                                                               | 0.140                                                               | 0.336                                                               | 0.381                                                              |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 35.3                                                               | 132                                                                 | 134                                                                 | 71.8                                                                | 174                                                                |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 9.44                                                               | 31.4                                                                | 27.6                                                                | 20.3                                                                | 41.9                                                               |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <1.5                                                               | <1.5                                                                | <1.5                                                                | <1.5                                                                | <1.5                                                               |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.50                                                              | <0.50                                                               | <0.50                                                               | <0.50                                                               | <0.50                                                              |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <1.5                                                               | <1.5                                                                | <1.5                                                                | <1.5                                                                | <1.5                                                               |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.15                                                              | <0.15                                                               | <0.15                                                               | <0.15                                                               | <0.15                                                              |
|                                                                       | Boron (B)-Total (mg/kg)           | <50                                                                | <50                                                                 | <50                                                                 | <50                                                                 | <50                                                                |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | <10                                                                | <10                                                                 | <10                                                                 | <10                                                                 | <10                                                                |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 1.05                                                               | 3.64                                                                | 2.29                                                                | 2.71                                                                | 2.64                                                               |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.280                                                              | 0.863                                                               | 0.474                                                               | 0.766                                                               | 0.634                                                              |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 7830                                                               | 19100                                                               | 6900                                                                | 3450                                                                | 2290                                                               |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 2090                                                               | 4530                                                                | 1420                                                                | 976                                                                 | 550                                                                |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 5.2                                                                | 14.6                                                                | 97.7                                                                | 28.1                                                                | 3.9                                                                |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 1.39                                                               | 3.46                                                                | 20.2                                                                | 7.95                                                                | 0.93                                                               |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 0.76                                                               | 6.94                                                                | 17.9                                                                | 4.00                                                                | 5.97                                                               |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 0.20                                                               | 1.65                                                                | 3.70                                                                | 1.13                                                                | 1.43                                                               |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 24.2                                                               | 141                                                                 | 165                                                                 | 208                                                                 | 229                                                                |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 6.48                                                               | 33.4                                                                | 34.0                                                                | 58.8                                                                | 55.1                                                               |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 29.1                                                               | 23.7                                                                | 42.5                                                                | 32.3                                                                | 473                                                                |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 7.77                                                               | 5.62                                                                | 8.77                                                                | 9.12                                                                | 114                                                                |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <2.5                                                               | 3.1                                                                 | <2.5                                                                | 2.6                                                                 | <2.5                                                               |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | 0.54                                                               | 0.73                                                                | <0.50                                                               | 0.74                                                                | <0.50                                                              |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 635                                                                | 1210                                                                | 903                                                                 | 741                                                                 | 780                                                                |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 170                                                                | 287                                                                 | 186                                                                 | 210                                                                 | 187                                                                |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 33.0                                                               | 234                                                                 | 400                                                                 | 162                                                                 | 115                                                                |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 8.82                                                               | 55.4                                                                | 82.6                                                                | 45.7                                                                | 27.6                                                               |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 1.79                                                               | 1.44                                                                | 0.612                                                               | 0.567                                                               | 2.13                                                               |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.479                                                              | 0.341                                                               | 0.126                                                               | 0.160                                                               | 0.512                                                              |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 3.26                                                               | 1.68                                                                | 0.85                                                                | 15.2                                                                | 83.1                                                               |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.871                                                              | 0.398                                                               | 0.176                                                               | 4.30                                                                | 19.9                                                               |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | <2.5                                                               | 5.5                                                                 | 20.5                                                                | 4.7                                                                 | <2.5                                                               |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | <0.50                                                              | 1.30                                                                | 4.23                                                                | 1.33                                                                | <0.50                                                              |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 19.5                                                               | 27.3                                                                | 10.8                                                                | 15.3                                                                | 39.6                                                               |
|                                                                       | Selenium (Se)-Total (mg/kg wwt)   | 5.2                                                                | 6.5                                                                 | 2.2                                                                 | 4.3                                                                 | 9.5                                                                |

# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                   | L780819-6 | L780819-7 |  |  |
|-----------------------------------------------------------------------|-----------------------------------|-----------|-----------|--|--|
| Grouping                                                              | Analyte                           |           |           |  |  |
| TISSUE                                                                |                                   |           |           |  |  |
| Physical Tests                                                        | % Moisture (%)                    | 79.5      | 73.7      |  |  |
| Metals                                                                | Aluminum (Al)-Total (mg/kg)       | 30800     | 28000     |  |  |
|                                                                       | Aluminum (Al)-Total (mg/kg wwt)   | 6300      | 7360      |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg)       | <0.25     | <0.25     |  |  |
|                                                                       | Antimony (Sb)-Total (mg/kg wwt)   | <0.050    | <0.050    |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg)        | 1.11      | 2.21      |  |  |
|                                                                       | Arsenic (As)-Total (mg/kg wwt)    | 0.227     | 0.580     |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg)         | 98.1      | 388       |  |  |
|                                                                       | Barium (Ba)-Total (mg/kg wwt)     | 20.1      | 102       |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg)      | <1.5      | <1.5      |  |  |
|                                                                       | Beryllium (Be)-Total (mg/kg wwt)  | <0.50     | <0.50     |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg)        | <1.5      | <1.5      |  |  |
|                                                                       | Bismuth (Bi)-Total (mg/kg wwt)    | <0.15     | <0.15     |  |  |
|                                                                       | Boron (B)-Total (mg/kg)           | <50       | <50       |  |  |
|                                                                       | Boron (B)-Total (mg/kg wwt)       | <10       | <10       |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg)        | 2.60      | 2.44      |  |  |
|                                                                       | Cadmium (Cd)-Total (mg/kg wwt)    | 0.533     | 0.641     |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg)        | 7290      | 7290      |  |  |
|                                                                       | Calcium (Ca)-Total (mg/kg wwt)    | 1490      | 1920      |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg)       | 47.6      | 5.9       |  |  |
|                                                                       | Chromium (Cr)-Total (mg/kg wwt)   | 9.74      | 1.55      |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg)         | 4.91      | 4.66      |  |  |
|                                                                       | Cobalt (Co)-Total (mg/kg wwt)     | 1.01      | 1.22      |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg)         | 79.1      | 398       |  |  |
|                                                                       | Copper (Cu)-Total (mg/kg wwt)     | 16.2      | 105       |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg)           | 27.6      | 460       |  |  |
|                                                                       | Lead (Pb)-Total (mg/kg wwt)       | 5.65      | 121       |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg)        | <2.5      | <2.5      |  |  |
|                                                                       | Lithium (Li)-Total (mg/kg wwt)    | <0.50     | 0.60      |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg)      | 1210      | 977       |  |  |
|                                                                       | Magnesium (Mg)-Total (mg/kg wwt)  | 248       | 257       |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg)      | 264       | 61.6      |  |  |
|                                                                       | Manganese (Mn)-Total (mg/kg wwt)  | 54.1      | 16.2      |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg)        | 0.589     | 0.439     |  |  |
|                                                                       | Mercury (Hg)-Total (mg/kg wwt)    | 0.121     | 0.115     |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg)     | 0.98      | 68.5      |  |  |
|                                                                       | Molybdenum (Mo)-Total (mg/kg wwt) | 0.201     | 18.0      |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg)         | 8.6       | <2.5      |  |  |
|                                                                       | Nickel (Ni)-Total (mg/kg wwt)     | 1.76      | <0.50     |  |  |
|                                                                       | Selenium (Se)-Total (mg/kg)       | 7.9       | 31.4      |  |  |
|                                                                       | Selenium (Se)-Total (mg/kg wwt)   | 1.6       | 8.2       |  |  |



# ALS LABORATORY GROUP ANALYTICAL REPORT

| Sample ID<br>Description<br>Sampled Date<br>Sampled Time<br>Client ID |                                  | L780819-1                                    | L780819-2                                     | L780819-3                                     | L780819-4                                     | L780819-5                                    |
|-----------------------------------------------------------------------|----------------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|----------------------------------------------|
| Grouping Analyte                                                      |                                  | SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>8:20 | SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>10:10 | SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>11:20 | SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>13:20 | SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>8:40 |
| TISSUE                                                                |                                  |                                              |                                               |                                               |                                               |                                              |
| Metals                                                                | Silver (Ag)-Total (mg/kg)        | <0.15                                        | 0.45                                          | 0.45                                          | <0.15                                         | 0.59                                         |
|                                                                       | Silver (Ag)-Total (mg/kg wwt)    | <0.050                                       | 0.108                                         | 0.092                                         | <0.050                                        | 0.141                                        |
|                                                                       | Strontium (Sr)-Total (mg/kg)     | 23.2                                         | 37.9                                          | 36.0                                          | 14.8                                          | 49.6                                         |
|                                                                       | Strontium (Sr)-Total (mg/kg wwt) | 6.20                                         | 8.98                                          | 7.44                                          | 4.17                                          | 11.9                                         |
|                                                                       | Thallium (Tl)-Total (mg/kg)      | <0.15                                        | <0.15                                         | <0.15                                         | <0.15                                         | 0.23                                         |
|                                                                       | Thallium (Tl)-Total (mg/kg wwt)  | <0.050                                       | <0.050                                        | <0.050                                        | <0.050                                        | 0.054                                        |
|                                                                       | Tin (Sn)-Total (mg/kg)           | <1.0                                         | <1.0                                          | <1.0                                          | <1.0                                          | <1.0                                         |
|                                                                       | Tin (Sn)-Total (mg/kg wwt)       | <0.25                                        | <0.25                                         | <0.25                                         | <0.25                                         | <0.25                                        |
|                                                                       | Uranium (U)-Total (mg/kg)        | 0.537                                        | 0.482                                         | 0.206                                         | 0.308                                         | 0.371                                        |
|                                                                       | Uranium (U)-Total (mg/kg wwt)    | 0.144                                        | 0.114                                         | 0.042                                         | 0.087                                         | 0.089                                        |
|                                                                       | Vanadium (V)-Total (mg/kg)       | 39.1                                         | 39.1                                          | 88.3                                          | 94.2                                          | 22.5                                         |
|                                                                       | Vanadium (V)-Total (mg/kg wwt)   | 10.5                                         | 9.27                                          | 18.2                                          | 26.6                                          | 5.39                                         |
|                                                                       | Zinc (Zn)-Total (mg/kg)          | 136                                          | 322                                           | 193                                           | 201                                           | 305                                          |
|                                                                       | Zinc (Zn)-Total (mg/kg wwt)      | 36.4                                         | 76.3                                          | 39.8                                          | 57.0                                          | 73.3                                         |

# ALS LABORATORY GROUP ANALYTICAL REPORT

|          |                                  | Sample ID                                                          |                                                                     |  |  |  |
|----------|----------------------------------|--------------------------------------------------------------------|---------------------------------------------------------------------|--|--|--|
|          |                                  | Description                                                        |                                                                     |  |  |  |
|          |                                  | Sampled Date                                                       |                                                                     |  |  |  |
|          |                                  | Sampled Time                                                       |                                                                     |  |  |  |
|          |                                  | Client ID                                                          |                                                                     |  |  |  |
| Grouping | Analyte                          |                                                                    |                                                                     |  |  |  |
| TISSUE   |                                  | L780819-6                                                          | L780819-7                                                           |  |  |  |
| Metals   | Silver (Ag)-Total (mg/kg)        | 26-APR-09<br>09:15<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>9:15 | 26-APR-09<br>11:30<br>SAMPLES<br>(LOMBRICUS<br>TERRESTRIS)<br>11:30 |  |  |  |
|          | Silver (Ag)-Total (mg/kg wwt)    |                                                                    |                                                                     |  |  |  |
|          | Strontium (Sr)-Total (mg/kg)     |                                                                    |                                                                     |  |  |  |
|          | Strontium (Sr)-Total (mg/kg wwt) |                                                                    |                                                                     |  |  |  |
|          | Thallium (Tl)-Total (mg/kg)      |                                                                    |                                                                     |  |  |  |
|          | Thallium (Tl)-Total (mg/kg wwt)  |                                                                    |                                                                     |  |  |  |
|          | Tin (Sn)-Total (mg/kg)           |                                                                    |                                                                     |  |  |  |
|          | Tin (Sn)-Total (mg/kg wwt)       |                                                                    |                                                                     |  |  |  |
|          | Uranium (U)-Total (mg/kg)        |                                                                    |                                                                     |  |  |  |
|          | Uranium (U)-Total (mg/kg wwt)    |                                                                    |                                                                     |  |  |  |
|          | Vanadium (V)-Total (mg/kg)       |                                                                    |                                                                     |  |  |  |
|          | Vanadium (V)-Total (mg/kg wwt)   |                                                                    |                                                                     |  |  |  |
|          | Zinc (Zn)-Total (mg/kg)          |                                                                    |                                                                     |  |  |  |
|          | Zinc (Zn)-Total (mg/kg wwt)      |                                                                    |                                                                     |  |  |  |

## Reference Information

### Additional Comments for Sample Listed:

| Samplenum | Matrix | Report Remarks | Sample Comments |
|-----------|--------|----------------|-----------------|
|-----------|--------|----------------|-----------------|

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

**AG-DRY-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**AG-WET-MS-VA** Tissue Silver in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-DRY-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**B-WET-MS-VA** Tissue Total Boron in Tissue by ICPMS PUGET SOUND PROTOCOLS, EPA 6020A

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

**HG-CCME-CVAFS-VA** Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

**HG-DRY-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**HG-WET-CVAFS-VA** Tissue Mercury in Tissue by CVAFS PUGET SOUND PROTOCOLS, EPA 245.7

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 245.7).

**MET-CSR-FULL-ICP-VA** Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

|                      |        |                           |                                  |
|----------------------|--------|---------------------------|----------------------------------|
| <b>MET-DRY-MS-VA</b> | Tissue | Metals in Tissue by ICPMS | PUGET SOUND PROTOCOLS, EPA 6020A |
|----------------------|--------|---------------------------|----------------------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

|                      |        |                           |                                  |
|----------------------|--------|---------------------------|----------------------------------|
| <b>MET-WET-MS-VA</b> | Tissue | Metals in Tissue by ICPMS | PUGET SOUND PROTOCOLS, EPA 6020A |
|----------------------|--------|---------------------------|----------------------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

|                         |        |                       |                      |
|-------------------------|--------|-----------------------|----------------------|
| <b>MOISTURE-TISS-VA</b> | Tissue | % Moisture in Tissues | ASTM METHOD D2974-00 |
|-------------------------|--------|-----------------------|----------------------|

This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.

|                  |      |                           |                                         |
|------------------|------|---------------------------|-----------------------------------------|
| <b>PH-1:2-VA</b> | Soil | CSR pH by 1:2 Water Leach | BC WLAP METHOD: PH, ELECTROMETRIC, SOIL |
|------------------|------|---------------------------|-----------------------------------------|

This analysis is carried out in accordance with procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

|                       |        |                             |                                          |
|-----------------------|--------|-----------------------------|------------------------------------------|
| <b>SE-DRY-HVAF-VA</b> | Tissue | Selenium in Tissue by HVAFS | PUGET SOUND PRT/ISO 17378&9-1 2006:DRAFT |
|-----------------------|--------|-----------------------------|------------------------------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (ISO/CD 17378&9-1 2006: DRAFT).

|                        |      |                                |                          |
|------------------------|------|--------------------------------|--------------------------|
| <b>SE-SALM-HVAF-VA</b> | Soil | Se in Soil by HVAFS (CSR SALM) | BCMELP CSR SALM METHOD 8 |
|------------------------|------|--------------------------------|--------------------------|

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Water Quality - Determination of As/Se/Sb, Part 1 - Hydride Generation Atomic Fluorescence Spectrometry (HG-AFS)", by the International Organization for Standardization (ISO). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry.

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

|                       |        |                             |                                          |
|-----------------------|--------|-----------------------------|------------------------------------------|
| <b>SE-WET-HVAF-VA</b> | Tissue | Selenium in Tissue by HVAFS | PUGET SOUND PRT/ISO 17378&9-1 2006:DRAFT |
|-----------------------|--------|-----------------------------|------------------------------------------|

This analysis is carried out using procedures adapted from "Recommended Guidelines for Measuring Metals in Puget Sound Marine Water, Sediment, and Tissue Samples" prepared for the United States Environmental Protection Agency and the Puget Sound Water Quality Authority, 1995. Tissue samples are homogenized either mechanically or manually prior to digestion. The hotplate or block digestion involves the use of nitric acid followed by repeated additions of hydrogen peroxide. Instrumental analysis is by atomic fluorescence spectrophotometry (ISO/CD 17378&9-1 2006:

## Reference Information

### Methods Listed (if applicable):

| ALS Test Code | Matrix | Test Description | Analytical Method Reference(Based On) |
|---------------|--------|------------------|---------------------------------------|
|---------------|--------|------------------|---------------------------------------|

DRAFT).

|                     |      |                              |                          |
|---------------------|------|------------------------------|--------------------------|
| <b>TL-CSR-MS-VA</b> | Soil | ICPMS TI in Soil by CSR SALM | BCMELP CSR SALM Method 8 |
|---------------------|------|------------------------------|--------------------------|

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

**\*\* Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies. The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:**

| Laboratory Definition Code | Laboratory Location                          | Laboratory Definition Code | Laboratory Location |
|----------------------------|----------------------------------------------|----------------------------|---------------------|
| VA                         | ALS LABORATORY GROUP - VANCOUVER, BC, CANADA |                            |                     |

### GLOSSARY OF REPORT TERMS

**Surr** - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.



Environmental Division

# ALS Laboratory Group Quality Control Report

Workorder: L780819

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Client: GOLDER ASSOCIATES LTD.  
500 - 4260 STILL CREEK DRIVE  
BURNABY BC V5C 6C6

Contact: AUDREY WAGENAAR

| Test                       | Matrix         | Reference              | Result  | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|---------|-----------|-------|-----|--------|-----------|
| <b>HG-CCME-CVAFS-VA</b>    |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R850646</b> |                        |         |           |       |     |        |           |
| <b>WG966376-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 123     |           | %     |     | 86-139 | 03-JUL-09 |
| <b>WG966376-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 113     |           | %     |     | 85-116 | 03-JUL-09 |
| <b>WG966376-7</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 120     |           | %     |     | 86-139 | 03-JUL-09 |
| <b>WG966376-8</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 112     |           | %     |     | 85-116 | 03-JUL-09 |
| <b>WG966376-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 03-JUL-09 |
| <b>WG966376-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 03-JUL-09 |
| <b>WG966376-9</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 03-JUL-09 |
| <b>Batch</b>               | <b>R855408</b> |                        |         |           |       |     |        |           |
| <b>WG967298-3</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 115     |           | %     |     | 86-139 | 06-JUL-09 |
| <b>WG967298-4</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | 114     |           | %     |     | 85-116 | 06-JUL-09 |
| <b>WG967298-1</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 06-JUL-09 |
| <b>WG967298-2</b>          | <b>MB</b>      |                        |         |           |       |     |        |           |
| Mercury (Hg)               |                |                        | <0.0050 |           | mg/kg |     | 0.005  | 06-JUL-09 |
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |         |           |       |     |        |           |
| <b>Batch</b>               | <b>R850893</b> |                        |         |           |       |     |        |           |
| <b>WG966376-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |         |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28      |           | %     |     | 27-28  | 02-JUL-09 |
| Arsenic (As)               |                |                        | 98      |           | %     |     | 83-117 | 02-JUL-09 |
| Barium (Ba)                |                |                        | 13      |           | %     |     | 11-14  | 02-JUL-09 |
| Beryllium (Be)             |                |                        | 97      |           | %     |     | 80-120 | 02-JUL-09 |
| Calcium (Ca)               |                |                        | 20      |           | %     |     | 12-22  | 02-JUL-09 |
| Chromium (Cr)              |                |                        | 45      |           | %     |     | 39-50  | 02-JUL-09 |
| Cobalt (Co)                |                |                        | 72      |           | %     |     | 67-77  | 02-JUL-09 |
| Copper (Cu)                |                |                        | 112     | RM-H      | %     |     | 93-112 | 02-JUL-09 |
| Iron (Fe)                  |                |                        | 71      |           | %     |     | 51-86  | 02-JUL-09 |
| Magnesium (Mg)             |                |                        | 52      |           | %     |     | 47-54  | 02-JUL-09 |
| Manganese (Mn)             |                |                        | 82      |           | %     |     | 75-89  | 02-JUL-09 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R850893</b> |                        |        |           |       |     |        |           |
| <b>WG966376-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Nickel (Ni)                |                |                        | 73     |           | %     |     | 59-95  | 02-JUL-09 |
| Phosphorus (P)             |                |                        | 92     |           | %     |     | 84-101 | 02-JUL-09 |
| Potassium (K)              |                |                        | 4      |           | %     |     | 2-4    | 02-JUL-09 |
| Sodium (Na)                |                |                        | 2      |           | %     |     | 1-2    | 02-JUL-09 |
| Strontium (Sr)             |                |                        | 4      |           | %     |     | 3-4    | 02-JUL-09 |
| Titanium (Ti)              |                |                        | 14     | RM-H      | %     |     | 7-13   | 02-JUL-09 |
| Vanadium (V)               |                |                        | 62     |           | %     |     | 53-68  | 02-JUL-09 |
| Zinc (Zn)                  |                |                        | 97     |           | %     |     | 80-120 | 02-JUL-09 |
| <b>WG966376-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 31     |           | %     |     | 23-32  | 02-JUL-09 |
| Arsenic (As)               |                |                        | 104    |           | %     |     | 91-115 | 02-JUL-09 |
| Beryllium (Be)             |                |                        | 18     |           | %     |     | 10-20  | 02-JUL-09 |
| Cadmium (Cd)               |                |                        | 114    |           | %     |     | 80-148 | 02-JUL-09 |
| Calcium (Ca)               |                |                        | 44     |           | %     |     | 36-48  | 02-JUL-09 |
| Chromium (Cr)              |                |                        | 58     | RM-H      | %     |     | 52-58  | 02-JUL-09 |
| Cobalt (Co)                |                |                        | 77     |           | %     |     | 70-79  | 02-JUL-09 |
| Copper (Cu)                |                |                        | 111    |           | %     |     | 95-115 | 02-JUL-09 |
| Iron (Fe)                  |                |                        | 79     |           | %     |     | 74-86  | 02-JUL-09 |
| Lead (Pb)                  |                |                        | 97     |           | %     |     | 85-109 | 02-JUL-09 |
| Lithium (Li)               |                |                        | 89     |           | %     |     | 65-95  | 02-JUL-09 |
| Magnesium (Mg)             |                |                        | 77     |           | %     |     | 69-80  | 02-JUL-09 |
| Manganese (Mn)             |                |                        | 61     |           | %     |     | 58-65  | 02-JUL-09 |
| Nickel (Ni)                |                |                        | 80     |           | %     |     | 74-88  | 02-JUL-09 |
| Phosphorus (P)             |                |                        | 107    |           | %     |     | 83-118 | 02-JUL-09 |
| Potassium (K)              |                |                        | 28     |           | %     |     | 21-31  | 02-JUL-09 |
| Strontium (Sr)             |                |                        | 25     |           | %     |     | 20-30  | 02-JUL-09 |
| Tin (Sn)                   |                |                        | 99     |           | %     |     | 77-116 | 02-JUL-09 |
| Titanium (Ti)              |                |                        | 23     |           | %     |     | 18-26  | 02-JUL-09 |
| Vanadium (V)               |                |                        | 62     |           | %     |     | 56-64  | 02-JUL-09 |
| Zinc (Zn)                  |                |                        | 94     |           | %     |     | 89-107 | 02-JUL-09 |
| <b>WG966376-7</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28     |           | %     |     | 27-28  | 02-JUL-09 |
| Arsenic (As)               |                |                        | 100    |           | %     |     | 83-117 | 02-JUL-09 |
| Barium (Ba)                |                |                        | 13     |           | %     |     | 11-14  | 02-JUL-09 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R850893</b> |                        |        |           |       |     |        |           |
| <b>WG966376-7</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Beryllium (Be)             |                |                        | 100    |           | %     |     | 80-120 | 02-JUL-09 |
| Calcium (Ca)               |                |                        | 18     |           | %     |     | 12-22  | 02-JUL-09 |
| Chromium (Cr)              |                |                        | 46     |           | %     |     | 39-50  | 02-JUL-09 |
| Cobalt (Co)                |                |                        | 75     |           | %     |     | 67-77  | 02-JUL-09 |
| Copper (Cu)                |                |                        | 112    | RM-H      | %     |     | 93-112 | 02-JUL-09 |
| Iron (Fe)                  |                |                        | 72     |           | %     |     | 51-86  | 02-JUL-09 |
| Magnesium (Mg)             |                |                        | 53     |           | %     |     | 47-54  | 02-JUL-09 |
| Manganese (Mn)             |                |                        | 82     |           | %     |     | 75-89  | 02-JUL-09 |
| Nickel (Ni)                |                |                        | 74     |           | %     |     | 59-95  | 02-JUL-09 |
| Phosphorus (P)             |                |                        | 89     |           | %     |     | 84-101 | 02-JUL-09 |
| Potassium (K)              |                |                        | 4      |           | %     |     | 2-4    | 02-JUL-09 |
| Sodium (Na)                |                |                        | 2      |           | %     |     | 1-2    | 02-JUL-09 |
| Strontium (Sr)             |                |                        | 4      |           | %     |     | 3-4    | 02-JUL-09 |
| Titanium (Ti)              |                |                        | 14     | RM-H      | %     |     | 7-13   | 02-JUL-09 |
| Vanadium (V)               |                |                        | 62     |           | %     |     | 53-68  | 02-JUL-09 |
| Zinc (Zn)                  |                |                        | 97     |           | %     |     | 80-120 | 02-JUL-09 |
| <b>WG966376-8</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 30     |           | %     |     | 23-32  | 02-JUL-09 |
| Arsenic (As)               |                |                        | 100    |           | %     |     | 91-115 | 02-JUL-09 |
| Beryllium (Be)             |                |                        | 16     |           | %     |     | 10-20  | 02-JUL-09 |
| Cadmium (Cd)               |                |                        | 114    |           | %     |     | 80-148 | 02-JUL-09 |
| Calcium (Ca)               |                |                        | 42     |           | %     |     | 36-48  | 02-JUL-09 |
| Chromium (Cr)              |                |                        | 57     |           | %     |     | 52-58  | 02-JUL-09 |
| Cobalt (Co)                |                |                        | 76     |           | %     |     | 70-79  | 02-JUL-09 |
| Copper (Cu)                |                |                        | 109    |           | %     |     | 95-115 | 02-JUL-09 |
| Iron (Fe)                  |                |                        | 79     |           | %     |     | 74-86  | 02-JUL-09 |
| Lead (Pb)                  |                |                        | 94     |           | %     |     | 85-109 | 02-JUL-09 |
| Lithium (Li)               |                |                        | 89     |           | %     |     | 65-95  | 02-JUL-09 |
| Magnesium (Mg)             |                |                        | 77     |           | %     |     | 69-80  | 02-JUL-09 |
| Manganese (Mn)             |                |                        | 60     |           | %     |     | 58-65  | 02-JUL-09 |
| Nickel (Ni)                |                |                        | 80     |           | %     |     | 74-88  | 02-JUL-09 |
| Phosphorus (P)             |                |                        | 107    |           | %     |     | 83-118 | 02-JUL-09 |
| Potassium (K)              |                |                        | 29     |           | %     |     | 21-31  | 02-JUL-09 |
| Strontium (Sr)             |                |                        | 26     |           | %     |     | 20-30  | 02-JUL-09 |



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| Test                | Matrix  | Reference    | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|---------------------|---------|--------------|--------|-----------|-------|-----|--------|-----------|
| MET-CSR-FULL-ICP-VA | Soil    |              |        |           |       |     |        |           |
| Batch               | R850893 |              |        |           |       |     |        |           |
| WG966376-8          | CRM     | VA-NRC-PACS2 |        |           |       |     |        |           |
| Tin (Sn)            |         |              | 97     |           | %     |     | 77-116 | 02-JUL-09 |
| Titanium (Ti)       |         |              | 22     |           | %     |     | 18-26  | 02-JUL-09 |
| Vanadium (V)        |         |              | 61     |           | %     |     | 56-64  | 02-JUL-09 |
| Zinc (Zn)           |         |              | 92     |           | %     |     | 89-107 | 02-JUL-09 |
| WG966376-1          | MB      |              |        |           |       |     |        |           |
| Aluminum (Al)       |         |              | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Antimony (Sb)       |         |              | <10    |           | mg/kg |     | 10     | 02-JUL-09 |
| Arsenic (As)        |         |              | <5.0   |           | mg/kg |     | 5      | 02-JUL-09 |
| Barium (Ba)         |         |              | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Beryllium (Be)      |         |              | <0.50  |           | mg/kg |     | 0.5    | 02-JUL-09 |
| Bismuth (Bi)        |         |              | <20    |           | mg/kg |     | 20     | 02-JUL-09 |
| Cadmium (Cd)        |         |              | <0.50  |           | mg/kg |     | 0.5    | 02-JUL-09 |
| Calcium (Ca)        |         |              | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Chromium (Cr)       |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Cobalt (Co)         |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Copper (Cu)         |         |              | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Iron (Fe)           |         |              | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Lead (Pb)           |         |              | <30    |           | mg/kg |     | 30     | 02-JUL-09 |
| Lithium (Li)        |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Magnesium (Mg)      |         |              | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Manganese (Mn)      |         |              | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Molybdenum (Mo)     |         |              | <4.0   |           | mg/kg |     | 4      | 02-JUL-09 |
| Nickel (Ni)         |         |              | <5.0   |           | mg/kg |     | 5      | 02-JUL-09 |
| Phosphorus (P)      |         |              | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Potassium (K)       |         |              | <200   |           | mg/kg |     | 200    | 02-JUL-09 |
| Selenium (Se)       |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Silver (Ag)         |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Sodium (Na)         |         |              | <200   |           | mg/kg |     | 200    | 02-JUL-09 |
| Strontium (Sr)      |         |              | <0.50  |           | mg/kg |     | 0.5    | 02-JUL-09 |
| Tin (Sn)            |         |              | <5.0   |           | mg/kg |     | 5      | 02-JUL-09 |
| Titanium (Ti)       |         |              | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Vanadium (V)        |         |              | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Zinc (Zn)           |         |              | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| WG966376-2          | MB      |              |        |           |       |     |        |           |

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| Test                | Matrix  | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|---------------------|---------|-----------|--------|-----------|-------|-----|-------|-----------|
| MET-CSR-FULL-ICP-VA |         | Soil      |        |           |       |     |       |           |
| Batch               | R850893 |           |        |           |       |     |       |           |
| WG966376-2          | MB      |           |        |           |       |     |       |           |
| Aluminum (Al)       |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Antimony (Sb)       |         |           | <10    |           | mg/kg |     | 10    | 02-JUL-09 |
| Arsenic (As)        |         |           | <5.0   |           | mg/kg |     | 5     | 02-JUL-09 |
| Barium (Ba)         |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| Beryllium (Be)      |         |           | <0.50  |           | mg/kg |     | 0.5   | 02-JUL-09 |
| Bismuth (Bi)        |         |           | <20    |           | mg/kg |     | 20    | 02-JUL-09 |
| Cadmium (Cd)        |         |           | <0.50  |           | mg/kg |     | 0.5   | 02-JUL-09 |
| Calcium (Ca)        |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Chromium (Cr)       |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Cobalt (Co)         |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Copper (Cu)         |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| Iron (Fe)           |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Lead (Pb)           |         |           | <30    |           | mg/kg |     | 30    | 02-JUL-09 |
| Lithium (Li)        |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Magnesium (Mg)      |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Manganese (Mn)      |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| Molybdenum (Mo)     |         |           | <4.0   |           | mg/kg |     | 4     | 02-JUL-09 |
| Nickel (Ni)         |         |           | <5.0   |           | mg/kg |     | 5     | 02-JUL-09 |
| Phosphorus (P)      |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Potassium (K)       |         |           | <200   |           | mg/kg |     | 200   | 02-JUL-09 |
| Selenium (Se)       |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Silver (Ag)         |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Sodium (Na)         |         |           | <200   |           | mg/kg |     | 200   | 02-JUL-09 |
| Strontium (Sr)      |         |           | <0.50  |           | mg/kg |     | 0.5   | 02-JUL-09 |
| Tin (Sn)            |         |           | <5.0   |           | mg/kg |     | 5     | 02-JUL-09 |
| Titanium (Ti)       |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| Vanadium (V)        |         |           | <2.0   |           | mg/kg |     | 2     | 02-JUL-09 |
| Zinc (Zn)           |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| WG966376-9          | MB      |           |        |           |       |     |       |           |
| Aluminum (Al)       |         |           | <50    |           | mg/kg |     | 50    | 02-JUL-09 |
| Antimony (Sb)       |         |           | <10    |           | mg/kg |     | 10    | 02-JUL-09 |
| Arsenic (As)        |         |           | <5.0   |           | mg/kg |     | 5     | 02-JUL-09 |
| Barium (Ba)         |         |           | <1.0   |           | mg/kg |     | 1     | 02-JUL-09 |
| Beryllium (Be)      |         |           | <0.50  |           | mg/kg |     | 0.5   | 02-JUL-09 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R850893</b> |                        |        |           |       |     |        |           |
| <b>WG966376-9</b>          | <b>MB</b>      |                        |        |           |       |     |        |           |
| Bismuth (Bi)               |                |                        | <20    |           | mg/kg |     | 20     | 02-JUL-09 |
| Cadmium (Cd)               |                |                        | <0.50  |           | mg/kg |     | 0.5    | 02-JUL-09 |
| Calcium (Ca)               |                |                        | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Chromium (Cr)              |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Cobalt (Co)                |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Copper (Cu)                |                |                        | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Iron (Fe)                  |                |                        | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Lead (Pb)                  |                |                        | <30    |           | mg/kg |     | 30     | 02-JUL-09 |
| Lithium (Li)               |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Magnesium (Mg)             |                |                        | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Manganese (Mn)             |                |                        | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Molybdenum (Mo)            |                |                        | <4.0   |           | mg/kg |     | 4      | 02-JUL-09 |
| Nickel (Ni)                |                |                        | <5.0   |           | mg/kg |     | 5      | 02-JUL-09 |
| Phosphorus (P)             |                |                        | <50    |           | mg/kg |     | 50     | 02-JUL-09 |
| Potassium (K)              |                |                        | <200   |           | mg/kg |     | 200    | 02-JUL-09 |
| Selenium (Se)              |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Silver (Ag)                |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Sodium (Na)                |                |                        | <200   |           | mg/kg |     | 200    | 02-JUL-09 |
| Strontium (Sr)             |                |                        | <0.50  |           | mg/kg |     | 0.5    | 02-JUL-09 |
| Tin (Sn)                   |                |                        | <5.0   |           | mg/kg |     | 5      | 02-JUL-09 |
| Titanium (Ti)              |                |                        | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| Vanadium (V)               |                |                        | <2.0   |           | mg/kg |     | 2      | 02-JUL-09 |
| Zinc (Zn)                  |                |                        | <1.0   |           | mg/kg |     | 1      | 02-JUL-09 |
| <b>Batch</b>               | <b>R854105</b> |                        |        |           |       |     |        |           |
| <b>WG967298-3</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 28     |           | %     |     | 27-28  | 03-JUL-09 |
| Arsenic (As)               |                |                        | 94     |           | %     |     | 83-117 | 03-JUL-09 |
| Barium (Ba)                |                |                        | 13     |           | %     |     | 11-14  | 03-JUL-09 |
| Beryllium (Be)             |                |                        | 112    |           | %     |     | 80-120 | 03-JUL-09 |
| Calcium (Ca)               |                |                        | 21     |           | %     |     | 12-22  | 03-JUL-09 |
| Chromium (Cr)              |                |                        | 45     |           | %     |     | 39-50  | 03-JUL-09 |
| Cobalt (Co)                |                |                        | 77     |           | %     |     | 67-77  | 03-JUL-09 |
| Copper (Cu)                |                |                        | 111    |           | %     |     | 93-112 | 03-JUL-09 |
| Iron (Fe)                  |                |                        | 73     |           | %     |     | 51-86  | 03-JUL-09 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|--------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |        |           |
| <b>Batch</b>               | <b>R854105</b> |                        |        |           |       |     |        |           |
| <b>WG967298-3</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |        |           |
| Magnesium (Mg)             |                |                        | 52     |           | %     |     | 47-54  | 03-JUL-09 |
| Manganese (Mn)             |                |                        | 86     |           | %     |     | 75-89  | 03-JUL-09 |
| Nickel (Ni)                |                |                        | 76     |           | %     |     | 59-95  | 03-JUL-09 |
| Phosphorus (P)             |                |                        | 91     |           | %     |     | 84-101 | 03-JUL-09 |
| Potassium (K)              |                |                        | 4      |           | %     |     | 2-4    | 03-JUL-09 |
| Sodium (Na)                |                |                        | 2      |           | %     |     | 1-2    | 03-JUL-09 |
| Strontium (Sr)             |                |                        | 4      |           | %     |     | 3-4    | 03-JUL-09 |
| Titanium (Ti)              |                |                        | 15     | RM-H      | %     |     | 7-13   | 03-JUL-09 |
| Vanadium (V)               |                |                        | 63     |           | %     |     | 53-68  | 03-JUL-09 |
| Zinc (Zn)                  |                |                        | 104    |           | %     |     | 80-120 | 03-JUL-09 |
| <b>WG967298-4</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | 29     |           | %     |     | 23-32  | 03-JUL-09 |
| Arsenic (As)               |                |                        | 97     |           | %     |     | 91-115 | 03-JUL-09 |
| Beryllium (Be)             |                |                        | 20     |           | %     |     | 10-20  | 03-JUL-09 |
| Cadmium (Cd)               |                |                        | 100    |           | %     |     | 80-148 | 03-JUL-09 |
| Calcium (Ca)               |                |                        | 45     |           | %     |     | 36-48  | 03-JUL-09 |
| Chromium (Cr)              |                |                        | 52     | RM-L      | %     |     | 52-58  | 03-JUL-09 |
| Cobalt (Co)                |                |                        | 77     |           | %     |     | 70-79  | 03-JUL-09 |
| Copper (Cu)                |                |                        | 106    |           | %     |     | 95-115 | 03-JUL-09 |
| Iron (Fe)                  |                |                        | 80     |           | %     |     | 74-86  | 03-JUL-09 |
| Lead (Pb)                  |                |                        | 95     |           | %     |     | 85-109 | 03-JUL-09 |
| Lithium (Li)               |                |                        | 87     |           | %     |     | 65-95  | 03-JUL-09 |
| Magnesium (Mg)             |                |                        | 75     |           | %     |     | 69-80  | 03-JUL-09 |
| Manganese (Mn)             |                |                        | 61     |           | %     |     | 58-65  | 03-JUL-09 |
| Nickel (Ni)                |                |                        | 81     |           | %     |     | 74-88  | 03-JUL-09 |
| Phosphorus (P)             |                |                        | 107    |           | %     |     | 83-118 | 03-JUL-09 |
| Potassium (K)              |                |                        | 28     |           | %     |     | 21-31  | 03-JUL-09 |
| Strontium (Sr)             |                |                        | 25     |           | %     |     | 20-30  | 03-JUL-09 |
| Tin (Sn)                   |                |                        | 104    |           | %     |     | 77-116 | 03-JUL-09 |
| Titanium (Ti)              |                |                        | 23     |           | %     |     | 18-26  | 03-JUL-09 |
| Vanadium (V)               |                |                        | 60     |           | %     |     | 56-64  | 03-JUL-09 |
| Zinc (Zn)                  |                |                        | 99     |           | %     |     | 89-107 | 03-JUL-09 |
| <b>WG967298-1</b>          | <b>MB</b>      |                        |        |           |       |     |        |           |
| Aluminum (Al)              |                |                        | <50    |           | mg/kg |     | 50     | 03-JUL-09 |

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| Test                       | Matrix         | Reference   | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|-------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b> |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R854105</b> |             |        |           |       |     |       |           |
| <b>WG967298-1</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 03-JUL-09 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Bismuth (Bi)               |                |             | <20    |           | mg/kg |     | 20    | 03-JUL-09 |
| Cadmium (Cd)               |                |             | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Calcium (Ca)               |                |             | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Chromium (Cr)              |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Cobalt (Co)                |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Copper (Cu)                |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Iron (Fe)                  |                |             | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Lead (Pb)                  |                |             | <30    |           | mg/kg |     | 30    | 03-JUL-09 |
| Lithium (Li)               |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Magnesium (Mg)             |                |             | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Manganese (Mn)             |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Molybdenum (Mo)            |                |             | <4.0   |           | mg/kg |     | 4     | 03-JUL-09 |
| Nickel (Ni)                |                |             | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Phosphorus (P)             |                |             | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Potassium (K)              |                |             | <200   |           | mg/kg |     | 200   | 03-JUL-09 |
| Selenium (Se)              |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Silver (Ag)                |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Sodium (Na)                |                |             | <200   |           | mg/kg |     | 200   | 03-JUL-09 |
| Strontium (Sr)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Tin (Sn)                   |                |             | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Titanium (Ti)              |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Vanadium (V)               |                |             | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Zinc (Zn)                  |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| <b>WG967298-2</b>          | <b>MB</b>      |             |        |           |       |     |       |           |
| Aluminum (Al)              |                |             | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Antimony (Sb)              |                |             | <10    |           | mg/kg |     | 10    | 03-JUL-09 |
| Arsenic (As)               |                |             | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Barium (Ba)                |                |             | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Beryllium (Be)             |                |             | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Bismuth (Bi)               |                |             | <20    |           | mg/kg |     | 20    | 03-JUL-09 |

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| Test                       | Matrix         | Reference              | Result | Qualifier | Units | RPD | Limit | Analyzed  |
|----------------------------|----------------|------------------------|--------|-----------|-------|-----|-------|-----------|
| <b>MET-CSR-FULL-ICP-VA</b> |                | <b>Soil</b>            |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R854105</b> |                        |        |           |       |     |       |           |
| <b>WG967298-2</b>          | <b>MB</b>      |                        |        |           |       |     |       |           |
| Cadmium (Cd)               |                |                        | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Calcium (Ca)               |                |                        | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Chromium (Cr)              |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Cobalt (Co)                |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Copper (Cu)                |                |                        | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Iron (Fe)                  |                |                        | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Lead (Pb)                  |                |                        | <30    |           | mg/kg |     | 30    | 03-JUL-09 |
| Lithium (Li)               |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Magnesium (Mg)             |                |                        | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Manganese (Mn)             |                |                        | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Molybdenum (Mo)            |                |                        | <4.0   |           | mg/kg |     | 4     | 03-JUL-09 |
| Nickel (Ni)                |                |                        | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Phosphorus (P)             |                |                        | <50    |           | mg/kg |     | 50    | 03-JUL-09 |
| Potassium (K)              |                |                        | <200   |           | mg/kg |     | 200   | 03-JUL-09 |
| Selenium (Se)              |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Silver (Ag)                |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Sodium (Na)                |                |                        | <200   |           | mg/kg |     | 200   | 03-JUL-09 |
| Strontium (Sr)             |                |                        | <0.50  |           | mg/kg |     | 0.5   | 03-JUL-09 |
| Tin (Sn)                   |                |                        | <5.0   |           | mg/kg |     | 5     | 03-JUL-09 |
| Titanium (Ti)              |                |                        | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| Vanadium (V)               |                |                        | <2.0   |           | mg/kg |     | 2     | 03-JUL-09 |
| Zinc (Zn)                  |                |                        | <1.0   |           | mg/kg |     | 1     | 03-JUL-09 |
| <b>SE-SALM-HVAF-VA</b>     |                | <b>Soil</b>            |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R855744</b> |                        |        |           |       |     |       |           |
| <b>WG967298-1</b>          | <b>MB</b>      |                        |        |           |       |     |       |           |
| Selenium (Se)              |                |                        | <0.50  |           | mg/kg |     | 0.5   | 06-JUL-09 |
| <b>WG967298-2</b>          | <b>MB</b>      |                        |        |           |       |     |       |           |
| Selenium (Se)              |                |                        | <0.50  |           | mg/kg |     | 0.5   | 06-JUL-09 |
| <b>TL-CSR-MS-VA</b>        |                | <b>Soil</b>            |        |           |       |     |       |           |
| <b>Batch</b>               | <b>R852103</b> |                        |        |           |       |     |       |           |
| <b>WG966376-5</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |       |           |
| <b>WG966376-6</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |       |           |
| <b>WG966376-7</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |       |           |
| <b>WG966376-8</b>          | <b>CRM</b>     | <b>VA-NRC-PACS2</b>    |        |           |       |     |       |           |
| <b>WG967298-3</b>          | <b>CRM</b>     | <b>VA-CANMET-TILL1</b> |        |           |       |     |       |           |

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| Test              | Matrix  | Reference    | Result | Qualifier | Units     | RPD   | Limit | Analyzed  |
|-------------------|---------|--------------|--------|-----------|-----------|-------|-------|-----------|
| TL-CSR-MS-VA      | Soil    |              |        |           |           |       |       |           |
| Batch             | R852103 |              |        |           |           |       |       |           |
| WG967298-4        | CRM     | VA-NRC-PACS2 |        |           |           |       |       |           |
| WG966376-1        | MB      |              |        |           |           |       |       |           |
| Thallium (Tl)     |         |              | <1.0   |           | mg/kg     |       | 1     | 04-JUL-09 |
| WG966376-2        | MB      |              |        |           |           |       |       |           |
| Thallium (Tl)     |         |              | <1.0   |           | mg/kg     |       | 1     | 04-JUL-09 |
| WG966376-9        | MB      |              |        |           |           |       |       |           |
| Thallium (Tl)     |         |              | <1.0   |           | mg/kg     |       | 1     | 04-JUL-09 |
| WG967298-1        | MB      |              |        |           |           |       |       |           |
| Thallium (Tl)     |         |              | <1.0   |           | mg/kg     |       | 1     | 04-JUL-09 |
| WG967298-2        | MB      |              |        |           |           |       |       |           |
| Thallium (Tl)     |         |              | <1.0   |           | mg/kg     |       | 1     | 04-JUL-09 |
| AG-DRY-MS-VA      | Tissue  |              |        |           |           |       |       |           |
| Batch             | R863243 |              |        |           |           |       |       |           |
| WG970397-3        | DUP     | L780819-6    |        |           |           |       |       |           |
| Silver (Ag)-Total |         | 0.52         | 0.39   | J         | mg/kg     | 0.12  | 0.6   | 10-JUL-09 |
| WG970397-1        | MB      |              |        |           |           |       |       |           |
| Silver (Ag)-Total |         |              | <0.030 |           | mg/kg     |       | 0.03  | 10-JUL-09 |
| WG970397-2        | MB      |              |        |           |           |       |       |           |
| Silver (Ag)-Total |         |              | <0.030 |           | mg/kg     |       | 0.03  | 10-JUL-09 |
| AG-WET-MS-VA      | Tissue  |              |        |           |           |       |       |           |
| Batch             | R863205 |              |        |           |           |       |       |           |
| WG970397-3        | DUP     | L780819-6    |        |           |           |       |       |           |
| Silver (Ag)-Total |         | 0.106        | 0.080  | J         | mg/kg wwt | 0.025 | 0.2   | 10-JUL-09 |
| WG970397-1        | MB      |              |        |           |           |       |       |           |
| Silver (Ag)-Total |         |              | <0.010 |           | mg/kg wwt |       | 0.01  | 10-JUL-09 |
| WG970397-2        | MB      |              |        |           |           |       |       |           |
| Silver (Ag)-Total |         |              | <0.010 |           | mg/kg wwt |       | 0.01  | 10-JUL-09 |
| B-DRY-MS-VA       | Tissue  |              |        |           |           |       |       |           |
| Batch             | R864693 |              |        |           |           |       |       |           |
| WG970397-3        | DUP     | L780819-6    |        |           |           |       |       |           |
| Boron (B)-Total   |         | <50          | <50    | RPD-NA    | mg/kg     | N/A   | 39    | 13-JUL-09 |
| WG970397-1        | MB      |              |        |           |           |       |       |           |
| Boron (B)-Total   |         |              | <10    |           | mg/kg     |       | 10    | 13-JUL-09 |
| WG970397-2        | MB      |              |        |           |           |       |       |           |
| Boron (B)-Total   |         |              | <10    |           | mg/kg     |       | 10    | 13-JUL-09 |
| B-WET-MS-VA       | Tissue  |              |        |           |           |       |       |           |

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| Test                   | Matrix  | Reference    | Result  | Qualifier | Units     | RPD | Limit  | Analyzed  |
|------------------------|---------|--------------|---------|-----------|-----------|-----|--------|-----------|
| <b>B-WET-MS-VA</b>     |         |              |         |           |           |     |        |           |
| Tissue                 |         |              |         |           |           |     |        |           |
| Batch                  | R864688 |              |         |           |           |     |        |           |
| WG970397-3             | DUP     | L780819-6    |         |           |           |     |        |           |
| Boron (B)-Total        |         | <10          | <10     | RPD-NA    | mg/kg wwt | N/A | 39     | 13-JUL-09 |
| WG970397-1             | MB      |              |         |           |           |     |        |           |
| Boron (B)-Total        |         |              | <2.0    |           | mg/kg wwt |     | 2      | 13-JUL-09 |
| WG970397-2             | MB      |              |         |           |           |     |        |           |
| Boron (B)-Total        |         |              | <2.0    |           | mg/kg wwt |     | 2      | 13-JUL-09 |
| <b>HG-DRY-CVAFS-VA</b> |         |              |         |           |           |     |        |           |
| Tissue                 |         |              |         |           |           |     |        |           |
| Batch                  | R861548 |              |         |           |           |     |        |           |
| WG970397-1             | MB      |              |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | <0.0050 |           | mg/kg     |     | 0.005  | 13-JUL-09 |
| WG970397-2             | MB      |              |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | <0.0050 |           | mg/kg     |     | 0.005  | 13-JUL-09 |
| Batch                  | R861967 |              |         |           |           |     |        |           |
| WG970397-4             | CRM     | VA-NRC-TORT2 |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | 95      |           | %         |     | 85-115 | 13-JUL-09 |
| WG970397-5             | CRM     | VA-NIST-2976 |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | 92      |           | %         |     | 85-117 | 13-JUL-09 |
| WG970397-3             | DUP     | L780819-6    |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         | 0.589        | 0.519   |           | mg/kg     | 13  | 45     | 13-JUL-09 |
| <b>HG-WET-CVAFS-VA</b> |         |              |         |           |           |     |        |           |
| Tissue                 |         |              |         |           |           |     |        |           |
| Batch                  | R861964 |              |         |           |           |     |        |           |
| WG970397-4             | CRM     | VA-NRC-TORT2 |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | 95      |           | %         |     | 85-115 | 13-JUL-09 |
| WG970397-5             | CRM     | VA-NIST-2976 |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         |              | 92      |           | %         |     | 85-117 | 13-JUL-09 |
| WG970397-3             | DUP     | L780819-6    |         |           |           |     |        |           |
| Mercury (Hg)-Total     |         | 0.121        | 0.106   |           | mg/kg wwt | 13  | 45     | 13-JUL-09 |
| <b>MET-DRY-MS-VA</b>   |         |              |         |           |           |     |        |           |
| Tissue                 |         |              |         |           |           |     |        |           |
| Batch                  | R864693 |              |         |           |           |     |        |           |
| WG970397-4             | CRM     | VA-NRC-TORT2 |         |           |           |     |        |           |
| Arsenic (As)-Total     |         |              | 103     |           | %         |     | 83-108 | 13-JUL-09 |
| Cadmium (Cd)-Total     |         |              | 102     |           | %         |     | 91-122 | 13-JUL-09 |
| Copper (Cu)-Total      |         |              | 89      |           | %         |     | 80-108 | 13-JUL-09 |
| Lead (Pb)-Total        |         |              | 77      |           | %         |     | 67-141 | 13-JUL-09 |
| Manganese (Mn)-Total   |         |              | 103     |           | %         |     | 81-110 | 13-JUL-09 |
| Molybdenum (Mo)-Total  |         |              | 112     |           | %         |     | 87-115 | 13-JUL-09 |
| Nickel (Ni)-Total      |         |              | 92      |           | %         |     | 75-109 | 13-JUL-09 |



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| Test                  | Matrix         | Reference           | Result | Qualifier | Units | RPD  | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|-------|------|--------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>       |        |           |       |      |        |           |
| <b>Batch</b>          | <b>R864693</b> |                     |        |           |       |      |        |           |
| <b>WG970397-4</b>     | <b>CRM</b>     | <b>VA-NRC-TORT2</b> |        |           |       |      |        |           |
| Strontium (Sr)-Total  |                |                     | 89     |           | %     |      | 77-111 | 13-JUL-09 |
| Vanadium (V)-Total    |                |                     | 113    |           | %     |      | 90-125 | 13-JUL-09 |
| Zinc (Zn)-Total       |                |                     | 96     |           | %     |      | 84-118 | 13-JUL-09 |
| <b>WG970397-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                |                     | 92     |           | %     |      | 52-141 | 13-JUL-09 |
| Arsenic (As)-Total    |                |                     | 121    |           | %     |      | 83-137 | 13-JUL-09 |
| Cadmium (Cd)-Total    |                |                     | 119    |           | %     |      | 76-124 | 13-JUL-09 |
| Calcium (Ca)-Total    |                |                     | 96     |           | %     |      | 53-137 | 13-JUL-09 |
| Cobalt (Co)-Total     |                |                     | 122    |           | %     |      | 73-133 | 13-JUL-09 |
| Lead (Pb)-Total       |                |                     | 111    |           | %     |      | 62-144 | 13-JUL-09 |
| Magnesium (Mg)-Total  |                |                     | 92     |           | %     |      | 56-118 | 13-JUL-09 |
| Manganese (Mn)-Total  |                |                     | 118    |           | %     |      | 65-160 | 13-JUL-09 |
| Zinc (Zn)-Total       |                |                     | 112    |           | %     |      | 80-128 | 13-JUL-09 |
| <b>WG970397-3</b>     | <b>DUP</b>     | <b>L780819-6</b>    |        |           |       |      |        |           |
| Aluminum (Al)-Total   |                | 30800               | 30400  |           | mg/kg | 1.1  | 45     | 13-JUL-09 |
| Antimony (Sb)-Total   |                | <0.25               | <0.25  | RPD-NA    | mg/kg | N/A  | 45     | 13-JUL-09 |
| Arsenic (As)-Total    |                | 1.11                | 1.08   | J         | mg/kg | 0.02 | 1      | 13-JUL-09 |
| Barium (Ba)-Total     |                | 98.1                | 89.8   |           | mg/kg | 8.8  | 45     | 13-JUL-09 |
| Beryllium (Be)-Total  |                | <1.5                | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 13-JUL-09 |
| Bismuth (Bi)-Total    |                | <1.5                | <1.5   | RPD-NA    | mg/kg | N/A  | 45     | 13-JUL-09 |
| Cadmium (Cd)-Total    |                | 2.60                | 2.45   |           | mg/kg | 6.0  | 45     | 13-JUL-09 |
| Calcium (Ca)-Total    |                | 7290                | 7150   |           | mg/kg | 1.8  | 45     | 13-JUL-09 |
| Chromium (Cr)-Total   |                | 47.6                | 50.3   |           | mg/kg | 5.7  | 45     | 13-JUL-09 |
| Cobalt (Co)-Total     |                | 4.91                | 4.78   | J         | mg/kg | 0.13 | 2      | 13-JUL-09 |
| Copper (Cu)-Total     |                | 79.1                | 74.9   |           | mg/kg | 5.4  | 45     | 13-JUL-09 |
| Lead (Pb)-Total       |                | 27.6                | 24.6   |           | mg/kg | 11   | 45     | 13-JUL-09 |
| Lithium (Li)-Total    |                | <2.5                | <2.5   | RPD-NA    | mg/kg | N/A  | 45     | 13-JUL-09 |
| Magnesium (Mg)-Total  |                | 1210                | 1190   |           | mg/kg | 1.9  | 45     | 13-JUL-09 |
| Manganese (Mn)-Total  |                | 264                 | 262    |           | mg/kg | 0.65 | 45     | 13-JUL-09 |
| Molybdenum (Mo)-Total |                | 0.98                | 0.94   | J         | mg/kg | 0.04 | 1      | 13-JUL-09 |
| Nickel (Ni)-Total     |                | 8.6                 | 8.6    | J         | mg/kg | 0.0  | 10     | 13-JUL-09 |
| Strontium (Sr)-Total  |                | 41.8                | 40.7   |           | mg/kg | 2.5  | 45     | 13-JUL-09 |
| Thallium (Tl)-Total   |                | 0.16                | 0.16   | J         | mg/kg | 0.00 | 0.6    | 13-JUL-09 |
| Tin (Sn)-Total        |                | <1.0                | <1.0   | RPD-NA    | mg/kg | N/A  | 45     | 13-JUL-09 |

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| Test                  | Matrix         | Reference        | Result | Qualifier | Units | RPD   | Limit | Analyzed  |
|-----------------------|----------------|------------------|--------|-----------|-------|-------|-------|-----------|
| <b>MET-DRY-MS-VA</b>  |                | <b>Tissue</b>    |        |           |       |       |       |           |
| <b>Batch</b>          | <b>R864693</b> |                  |        |           |       |       |       |           |
| <b>WG970397-3</b>     | <b>DUP</b>     | <b>L780819-6</b> |        |           |       |       |       |           |
| Uranium (U)-Total     |                | 0.238            | 0.235  | J         | mg/kg | 0.003 | 0.2   | 13-JUL-09 |
| Vanadium (V)-Total    |                | 138              | 142    |           | mg/kg | 3.1   | 45    | 13-JUL-09 |
| Zinc (Zn)-Total       |                | 295              | 290    |           | mg/kg | 1.8   | 45    | 13-JUL-09 |
| <b>WG970397-1</b>     | <b>MB</b>      |                  |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                |                  | <10    |           | mg/kg |       | 10    | 13-JUL-09 |
| Antimony (Sb)-Total   |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Arsenic (As)-Total    |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Barium (Ba)-Total     |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Beryllium (Be)-Total  |                |                  | <0.30  |           | mg/kg |       | 0.3   | 13-JUL-09 |
| Bismuth (Bi)-Total    |                |                  | <0.30  |           | mg/kg |       | 0.3   | 13-JUL-09 |
| Cadmium (Cd)-Total    |                |                  | <0.030 |           | mg/kg |       | 0.03  | 13-JUL-09 |
| Calcium (Ca)-Total    |                |                  | <10    |           | mg/kg |       | 10    | 13-JUL-09 |
| Chromium (Cr)-Total   |                |                  | <0.50  |           | mg/kg |       | 0.5   | 13-JUL-09 |
| Cobalt (Co)-Total     |                |                  | <0.10  |           | mg/kg |       | 0.1   | 13-JUL-09 |
| Copper (Cu)-Total     |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Lead (Pb)-Total       |                |                  | <0.10  |           | mg/kg |       | 0.1   | 13-JUL-09 |
| Lithium (Li)-Total    |                |                  | <0.50  |           | mg/kg |       | 0.5   | 13-JUL-09 |
| Magnesium (Mg)-Total  |                |                  | <3.0   |           | mg/kg |       | 3     | 13-JUL-09 |
| Manganese (Mn)-Total  |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Molybdenum (Mo)-Total |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Nickel (Ni)-Total     |                |                  | <0.50  |           | mg/kg |       | 0.5   | 13-JUL-09 |
| Strontium (Sr)-Total  |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Thallium (Tl)-Total   |                |                  | <0.030 |           | mg/kg |       | 0.03  | 13-JUL-09 |
| Tin (Sn)-Total        |                |                  | <0.20  |           | mg/kg |       | 0.2   | 13-JUL-09 |
| Uranium (U)-Total     |                |                  | <0.010 |           | mg/kg |       | 0.01  | 13-JUL-09 |
| Vanadium (V)-Total    |                |                  | <0.50  |           | mg/kg |       | 0.5   | 13-JUL-09 |
| Zinc (Zn)-Total       |                |                  | <0.50  |           | mg/kg |       | 0.5   | 13-JUL-09 |
| <b>WG970397-2</b>     | <b>MB</b>      |                  |        |           |       |       |       |           |
| Aluminum (Al)-Total   |                |                  | <10    |           | mg/kg |       | 10    | 13-JUL-09 |
| Antimony (Sb)-Total   |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Arsenic (As)-Total    |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Barium (Ba)-Total     |                |                  | <0.050 |           | mg/kg |       | 0.05  | 13-JUL-09 |
| Beryllium (Be)-Total  |                |                  | <0.30  |           | mg/kg |       | 0.3   | 13-JUL-09 |
| Bismuth (Bi)-Total    |                |                  | <0.30  |           | mg/kg |       | 0.3   | 13-JUL-09 |

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| Test                  | Matrix  | Reference    | Result | Qualifier | Units | RPD | Limit  | Analyzed  |
|-----------------------|---------|--------------|--------|-----------|-------|-----|--------|-----------|
| MET-DRY-MS-VA         |         | Tissue       |        |           |       |     |        |           |
| Batch                 | R864693 |              |        |           |       |     |        |           |
| WG970397-2            | MB      |              |        |           |       |     |        |           |
| Cadmium (Cd)-Total    |         |              | <0.030 |           | mg/kg |     | 0.03   | 13-JUL-09 |
| Calcium (Ca)-Total    |         |              | <10    |           | mg/kg |     | 10     | 13-JUL-09 |
| Chromium (Cr)-Total   |         |              | <0.50  |           | mg/kg |     | 0.5    | 13-JUL-09 |
| Cobalt (Co)-Total     |         |              | <0.10  |           | mg/kg |     | 0.1    | 13-JUL-09 |
| Copper (Cu)-Total     |         |              | <0.050 |           | mg/kg |     | 0.05   | 13-JUL-09 |
| Lead (Pb)-Total       |         |              | <0.10  |           | mg/kg |     | 0.1    | 13-JUL-09 |
| Lithium (Li)-Total    |         |              | <0.50  |           | mg/kg |     | 0.5    | 13-JUL-09 |
| Magnesium (Mg)-Total  |         |              | <3.0   |           | mg/kg |     | 3      | 13-JUL-09 |
| Manganese (Mn)-Total  |         |              | <0.050 |           | mg/kg |     | 0.05   | 13-JUL-09 |
| Molybdenum (Mo)-Total |         |              | <0.050 |           | mg/kg |     | 0.05   | 13-JUL-09 |
| Nickel (Ni)-Total     |         |              | <0.50  |           | mg/kg |     | 0.5    | 13-JUL-09 |
| Strontium (Sr)-Total  |         |              | <0.050 |           | mg/kg |     | 0.05   | 13-JUL-09 |
| Thallium (Tl)-Total   |         |              | <0.030 |           | mg/kg |     | 0.03   | 13-JUL-09 |
| Tin (Sn)-Total        |         |              | <0.20  |           | mg/kg |     | 0.2    | 13-JUL-09 |
| Uranium (U)-Total     |         |              | <0.010 |           | mg/kg |     | 0.01   | 13-JUL-09 |
| Vanadium (V)-Total    |         |              | <0.50  |           | mg/kg |     | 0.5    | 13-JUL-09 |
| Zinc (Zn)-Total       |         |              | <0.50  |           | mg/kg |     | 0.5    | 13-JUL-09 |
| MET-WET-MS-VA         |         | Tissue       |        |           |       |     |        |           |
| Batch                 | R864688 |              |        |           |       |     |        |           |
| WG970397-4            | CRM     | VA-NRC-TORT2 |        |           |       |     |        |           |
| Arsenic (As)-Total    |         |              | 103    |           | %     |     | 83-108 | 13-JUL-09 |
| Cadmium (Cd)-Total    |         |              | 102    |           | %     |     | 91-122 | 13-JUL-09 |
| Copper (Cu)-Total     |         |              | 89     |           | %     |     | 80-108 | 13-JUL-09 |
| Lead (Pb)-Total       |         |              | 77     |           | %     |     | 67-141 | 13-JUL-09 |
| Manganese (Mn)-Total  |         |              | 103    |           | %     |     | 81-110 | 13-JUL-09 |
| Molybdenum (Mo)-Total |         |              | 112    |           | %     |     | 87-115 | 13-JUL-09 |
| Nickel (Ni)-Total     |         |              | 92     |           | %     |     | 75-109 | 13-JUL-09 |
| Strontium (Sr)-Total  |         |              | 89     |           | %     |     | 77-111 | 13-JUL-09 |
| Vanadium (V)-Total    |         |              | 113    |           | %     |     | 90-125 | 13-JUL-09 |
| Zinc (Zn)-Total       |         |              | 96     |           | %     |     | 84-118 | 13-JUL-09 |
| WG970397-5            | CRM     | VA-NIST-2976 |        |           |       |     |        |           |
| Aluminum (Al)-Total   |         |              | 92     |           | %     |     | 52-141 | 13-JUL-09 |
| Arsenic (As)-Total    |         |              | 121    |           | %     |     | 83-137 | 13-JUL-09 |
| Cadmium (Cd)-Total    |         |              | 119    |           | %     |     | 76-124 | 13-JUL-09 |

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| Test                  | Matrix         | Reference           | Result | Qualifier | Units    | RPD   | Limit  | Analyzed  |
|-----------------------|----------------|---------------------|--------|-----------|----------|-------|--------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b>       |        |           |          |       |        |           |
| <b>Batch</b>          | <b>R864688</b> |                     |        |           |          |       |        |           |
| <b>WG970397-5</b>     | <b>CRM</b>     | <b>VA-NIST-2976</b> |        |           |          |       |        |           |
| Calcium (Ca)-Total    |                |                     | 96     |           | %        |       | 53-137 | 13-JUL-09 |
| Cobalt (Co)-Total     |                |                     | 122    |           | %        |       | 73-133 | 13-JUL-09 |
| Lead (Pb)-Total       |                |                     | 111    |           | %        |       | 62-144 | 13-JUL-09 |
| Magnesium (Mg)-Total  |                |                     | 92     |           | %        |       | 56-118 | 13-JUL-09 |
| Manganese (Mn)-Total  |                |                     | 118    |           | %        |       | 65-160 | 13-JUL-09 |
| Zinc (Zn)-Total       |                |                     | 112    |           | %        |       | 80-128 | 13-JUL-09 |
| <b>WG970397-3</b>     | <b>DUP</b>     | <b>L780819-6</b>    |        |           |          |       |        |           |
| Aluminum (Al)-Total   |                | 6300                | 6230   |           | mg/kg ww | 1.1   | 45     | 13-JUL-09 |
| Antimony (Sb)-Total   |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Arsenic (As)-Total    |                | 0.227               | 0.222  | J         | mg/kg ww | 0.005 | 0.2    | 13-JUL-09 |
| Barium (Ba)-Total     |                | 20.1                | 18.4   |           | mg/kg ww | 8.8   | 45     | 13-JUL-09 |
| Beryllium (Be)-Total  |                | <0.50               | <0.50  | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Bismuth (Bi)-Total    |                | <0.15               | <0.15  | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Cadmium (Cd)-Total    |                | 0.533               | 0.503  |           | mg/kg ww | 6.0   | 45     | 13-JUL-09 |
| Calcium (Ca)-Total    |                | 1490                | 1470   |           | mg/kg ww | 1.8   | 45     | 13-JUL-09 |
| Chromium (Cr)-Total   |                | 9.74                | 10.3   |           | mg/kg ww | 5.7   | 45     | 13-JUL-09 |
| Cobalt (Co)-Total     |                | 1.01                | 0.98   | J         | mg/kg ww | 0.03  | 0.4    | 13-JUL-09 |
| Copper (Cu)-Total     |                | 16.2                | 15.4   |           | mg/kg ww | 5.4   | 45     | 13-JUL-09 |
| Lead (Pb)-Total       |                | 5.65                | 5.04   |           | mg/kg ww | 11    | 45     | 13-JUL-09 |
| Lithium (Li)-Total    |                | <0.50               | <0.50  | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Magnesium (Mg)-Total  |                | 248                 | 244    |           | mg/kg ww | 1.9   | 45     | 13-JUL-09 |
| Manganese (Mn)-Total  |                | 54.1                | 53.7   |           | mg/kg ww | 0.65  | 45     | 13-JUL-09 |
| Molybdenum (Mo)-Total |                | 0.201               | 0.192  | J         | mg/kg ww | 0.009 | 0.2    | 13-JUL-09 |
| Nickel (Ni)-Total     |                | 1.76                | 1.77   | J         | mg/kg ww | 0.01  | 2      | 13-JUL-09 |
| Strontium (Sr)-Total  |                | 8.56                | 8.35   |           | mg/kg ww | 2.5   | 45     | 13-JUL-09 |
| Thallium (Tl)-Total   |                | <0.050              | <0.050 | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Tin (Sn)-Total        |                | <0.25               | <0.25  | RPD-NA    | mg/kg ww | N/A   | 45     | 13-JUL-09 |
| Uranium (U)-Total     |                | 0.049               | 0.048  | J         | mg/kg ww | 0.001 | 0.04   | 13-JUL-09 |
| Vanadium (V)-Total    |                | 28.2                | 29.1   |           | mg/kg ww | 3.1   | 45     | 13-JUL-09 |
| Zinc (Zn)-Total       |                | 60.4                | 59.4   |           | mg/kg ww | 1.8   | 45     | 13-JUL-09 |
| <b>WG970397-1</b>     | <b>MB</b>      |                     |        |           |          |       |        |           |
| Aluminum (Al)-Total   |                |                     | <2.0   |           | mg/kg ww |       | 2      | 13-JUL-09 |
| Antimony (Sb)-Total   |                |                     | <0.010 |           | mg/kg ww |       | 0.01   | 13-JUL-09 |
| Arsenic (As)-Total    |                |                     | <0.010 |           | mg/kg ww |       | 0.01   | 13-JUL-09 |

# ALS Laboratory Group Quality Control Report

Workorder: L780819

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| Test                  | Matrix         | Reference     | Result  | Qualifier | Units    | RPD | Limit | Analyzed  |
|-----------------------|----------------|---------------|---------|-----------|----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |                | <b>Tissue</b> |         |           |          |     |       |           |
| <b>Batch</b>          | <b>R864688</b> |               |         |           |          |     |       |           |
| <b>WG970397-1</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 13-JUL-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 13-JUL-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 13-JUL-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 13-JUL-09 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 13-JUL-09 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Magnesium (Mg)-Total  |                |               | <1.0    |           | mg/kg ww |     | 1     | 13-JUL-09 |
| Manganese (Mn)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Molybdenum (Mo)-Total |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Nickel (Ni)-Total     |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Strontium (Sr)-Total  |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Thallium (Tl)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Tin (Sn)-Total        |                |               | <0.050  |           | mg/kg ww |     | 0.05  | 13-JUL-09 |
| Uranium (U)-Total     |                |               | <0.0020 |           | mg/kg ww |     | 0.002 | 13-JUL-09 |
| Vanadium (V)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Zinc (Zn)-Total       |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| <b>WG970397-2</b>     | <b>MB</b>      |               |         |           |          |     |       |           |
| Aluminum (Al)-Total   |                |               | <2.0    |           | mg/kg ww |     | 2     | 13-JUL-09 |
| Antimony (Sb)-Total   |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Arsenic (As)-Total    |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Barium (Ba)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Beryllium (Be)-Total  |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Bismuth (Bi)-Total    |                |               | <0.030  |           | mg/kg ww |     | 0.03  | 13-JUL-09 |
| Cadmium (Cd)-Total    |                |               | <0.0050 |           | mg/kg ww |     | 0.005 | 13-JUL-09 |
| Calcium (Ca)-Total    |                |               | <2.0    |           | mg/kg ww |     | 2     | 13-JUL-09 |
| Chromium (Cr)-Total   |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |
| Cobalt (Co)-Total     |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 13-JUL-09 |
| Copper (Cu)-Total     |                |               | <0.010  |           | mg/kg ww |     | 0.01  | 13-JUL-09 |
| Lead (Pb)-Total       |                |               | <0.020  |           | mg/kg ww |     | 0.02  | 13-JUL-09 |
| Lithium (Li)-Total    |                |               | <0.10   |           | mg/kg ww |     | 0.1   | 13-JUL-09 |

# ALS Laboratory Group Quality Control Report

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| Test                  | Matrix | Reference        | Result  | Qualifier | Units     | RPD | Limit | Analyzed  |
|-----------------------|--------|------------------|---------|-----------|-----------|-----|-------|-----------|
| <b>MET-WET-MS-VA</b>  |        | <b>Tissue</b>    |         |           |           |     |       |           |
| <b>Batch R864688</b>  |        |                  |         |           |           |     |       |           |
| <b>WG970397-2 MB</b>  |        |                  |         |           |           |     |       |           |
| Magnesium (Mg)-Total  |        |                  | <1.0    |           | mg/kg wwt |     | 1     | 13-JUL-09 |
| Manganese (Mn)-Total  |        |                  | <0.010  |           | mg/kg wwt |     | 0.01  | 13-JUL-09 |
| Molybdenum (Mo)-Total |        |                  | <0.010  |           | mg/kg wwt |     | 0.01  | 13-JUL-09 |
| Nickel (Ni)-Total     |        |                  | <0.10   |           | mg/kg wwt |     | 0.1   | 13-JUL-09 |
| Strontium (Sr)-Total  |        |                  | <0.010  |           | mg/kg wwt |     | 0.01  | 13-JUL-09 |
| Thallium (Tl)-Total   |        |                  | <0.010  |           | mg/kg wwt |     | 0.01  | 13-JUL-09 |
| Tin (Sn)-Total        |        |                  | <0.050  |           | mg/kg wwt |     | 0.05  | 13-JUL-09 |
| Uranium (U)-Total     |        |                  | <0.0020 |           | mg/kg wwt |     | 0.002 | 13-JUL-09 |
| Vanadium (V)-Total    |        |                  | <0.10   |           | mg/kg wwt |     | 0.1   | 13-JUL-09 |
| Zinc (Zn)-Total       |        |                  | <0.10   |           | mg/kg wwt |     | 0.1   | 13-JUL-09 |
| <b>SE-DRY-HVAF-VA</b> |        | <b>Tissue</b>    |         |           |           |     |       |           |
| <b>Batch R862047</b>  |        |                  |         |           |           |     |       |           |
| <b>WG970397-3 DUP</b> |        | <b>L780819-6</b> |         |           |           |     |       |           |
| Selenium (Se)-Total   |        | 7.9              | 7.9     | J         | mg/kg     | 0.0 | 20    | 13-JUL-09 |
| <b>WG970397-1 MB</b>  |        |                  |         |           |           |     |       |           |
| Selenium (Se)-Total   |        |                  | <0.10   |           | mg/kg     |     | 0.1   | 13-JUL-09 |
| <b>WG970397-2 MB</b>  |        |                  |         |           |           |     |       |           |
| Selenium (Se)-Total   |        |                  | <0.10   |           | mg/kg     |     | 0.1   | 13-JUL-09 |
| <b>SE-WET-HVAF-VA</b> |        | <b>Tissue</b>    |         |           |           |     |       |           |
| <b>Batch R862047</b>  |        |                  |         |           |           |     |       |           |
| <b>WG970397-1 MB</b>  |        |                  |         |           |           |     |       |           |
| Selenium (Se)-Total   |        |                  | <0.020  |           | mg/kg wwt |     | 0.02  | 13-JUL-09 |
| <b>WG970397-2 MB</b>  |        |                  |         |           |           |     |       |           |
| Selenium (Se)-Total   |        |                  | <0.020  |           | mg/kg wwt |     | 0.02  | 13-JUL-09 |

## ALS Laboratory Group Quality Control Report

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### Legend:

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|       |                                                     |
|-------|-----------------------------------------------------|
| Limit | 99% Confidence Interval (Laboratory Control Limits) |
| DUP   | Duplicate                                           |
| RPD   | Relative Percent Difference                         |
| N/A   | Not Available                                       |
| LCS   | Laboratory Control Sample                           |
| SRM   | Standard Reference Material                         |
| MS    | Matrix Spike                                        |
| MSD   | Matrix Spike Duplicate                              |
| ADE   | Average Desorption Efficiency                       |
| MB    | Method Blank                                        |
| IRM   | Internal Reference Material                         |
| CRM   | Certified Reference Material                        |
| CCV   | Continuing Calibration Verification                 |
| CVS   | Calibration Verification Standard                   |
| LCSD  | Laboratory Control Sample Duplicate                 |

### Sample Parameter Qualifier Definitions:

---

| Qualifier | Description                                                                                                                                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| J         | Duplicate results and limits are expressed in terms of absolute difference.                                                                                                                                          |
| RM-H      | Reference Material recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.                                                                 |
| RM-L      | Reference Material recovery was below ALS DQO. Lab Control Sample and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| RPD-NA    | Relative Percent Difference Not Available due to result(s) being less than detection limit.                                                                                                                          |

## ALS Laboratory Group Quality Control Report

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The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates that do not originate from this Work Order.





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|                                                                                                                                                   |                                                                       |                                                                            |                   |                                                                             |                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------|
| REPORT TO: Audrey Wagenaar                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                                               |                   | SERVICE REQUESTED                                                           |                                                                         |
| COMPANY: Golden Associates Ltd                                                                                                                    |                                                                       | STANDARD _____ OTHER _____                                                 |                   | <input checked="" type="checkbox"/> REGULAR SERVICE (DEFAULT)               |                                                                         |
| CONTACT: audrey-wagenaar@golder.com                                                                                                               |                                                                       | PDF <input checked="" type="checkbox"/> EXCEL _____ CUSTOM _____ FAX _____ |                   | <input type="checkbox"/> RUSH SERVICE (2-3 DAYS)                            |                                                                         |
| ADDRESS: 590 4260 Still Creek Drive                                                                                                               |                                                                       | EMAIL 1: audrey-wagenaar@golder.com                                        |                   | <input type="checkbox"/> PRIORITY SERVICE (1 DAY or ASAP)                   |                                                                         |
| Burnaby, BC                                                                                                                                       |                                                                       | EMAIL 2: adrian_debruyn@golder.com                                         |                   | <input type="checkbox"/> EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS |                                                                         |
| PHONE: 604 269-4200 FAX: 604 298-5253                                                                                                             |                                                                       |                                                                            |                   | ANALYSIS REQUEST                                                            |                                                                         |
| INVOICE TO: SAME AS REPORT? (YES) NO                                                                                                              |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →                         |                   |                                                                             |                                                                         |
| COMPANY:                                                                                                                                          |                                                                       | CLIENT / PROJECT INFORMATION:                                              |                   |                                                                             |                                                                         |
| CONTACT:                                                                                                                                          |                                                                       | JOB #:                                                                     |                   |                                                                             |                                                                         |
| ADDRESS:                                                                                                                                          |                                                                       | PO / AFE:                                                                  |                   |                                                                             |                                                                         |
| PHONE:                                                                                                                                            |                                                                       | Legal Site Description:                                                    |                   |                                                                             |                                                                         |
| FAX:                                                                                                                                              |                                                                       | QUOTE #:                                                                   |                   |                                                                             |                                                                         |
| Lab Work Order # L700819                                                                                                                          |                                                                       | SAMPLER (Initials):                                                        |                   |                                                                             |                                                                         |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) | DATE                                                                       | TIME              | SAMPLE TYPE                                                                 |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 25-4-2009                                                                  | 8:20              | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 25-4-2009                                                                  | 10:10             | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 25-4-2009                                                                  | 11:20             | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 25-4-2009                                                                  | 13:20             | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 26-4-2009                                                                  | 8:40              | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 26-4-2009                                                                  | 9:15              | Invertebrate                                                                |                                                                         |
|                                                                                                                                                   | Samples (hombricus terrestris)                                        | 26-4-2009                                                                  | 11:30             | Invertebrate                                                                |                                                                         |
| GUIDELINES / REGULATIONS                                                                                                                          |                                                                       |                                                                            |                   |                                                                             |                                                                         |
| SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS                                                                                                          |                                                                       |                                                                            |                   |                                                                             |                                                                         |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                       |                                                                            |                   |                                                                             |                                                                         |
| By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy. |                                                                       |                                                                            |                   |                                                                             |                                                                         |
| RELINQUISHED BY:                                                                                                                                  | DATE & TIME:                                                          | RECEIVED BY: HD 0106119                                                    | DATE & TIME: 2009 | TEMPERATURE                                                                 | SAMPLE CONDITION (lab use only)                                         |
| RELINQUISHED BY:                                                                                                                                  | DATE & TIME:                                                          | RECEIVED BY:                                                               | DATE & TIME:      | 11                                                                          | SAMPLES RECEIVED IN GOOD CONDITION? YES / NO<br>(If no provide details) |



Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

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|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------|---------------------------------------------------------------|-----------------------------------------------|
| REPORT TO: Audrey Wagenaar                                                                                                                        |                                                                       | REPORT FORMAT / DISTRIBUTION                                               |              | SERVICE REQUESTED                                             |                                               |
| COMPANY: Golder Associates Ltd                                                                                                                    |                                                                       | STANDARD _____ OTHER _____                                                 |              | <input checked="" type="checkbox"/> REGULAR SERVICE (DEFAULT) |                                               |
| CONTACT: audrey-wagenaar@golder.ca                                                                                                                |                                                                       | PDF <input checked="" type="checkbox"/> EXCEL _____ CUSTOM _____ FAX _____ |              | RUSH SERVICE (2-3 DAYS)                                       |                                               |
| ADDRESS: 500 4260 Still Creek Drive,                                                                                                              |                                                                       | EMAIL 1: _____                                                             |              | PRIORITY SERVICE (1 DAY or ASAP)                              |                                               |
| Burnaby, BC                                                                                                                                       |                                                                       | EMAIL 2: _____                                                             |              | EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS            |                                               |
| PHONE: 604 269-4200 FAX: 604 298-5253                                                                                                             |                                                                       | INDICATE BOTTLES: FILTERED / PRESERVED (F/P) _____                         |              | ANALYSIS REQUEST                                              |                                               |
| INVOICE TO: SAME AS REPORT ? (YES / NO)                                                                                                           |                                                                       | CLIENT / PROJECT INFORMATION:                                              |              |                                                               |                                               |
| COMPANY:                                                                                                                                          |                                                                       | JOB #:                                                                     |              |                                                               |                                               |
| CONTACT:                                                                                                                                          |                                                                       | PO / AFE:                                                                  |              |                                                               |                                               |
| ADDRESS:                                                                                                                                          |                                                                       | Legal Site Description:                                                    |              |                                                               |                                               |
| PHONE:                                                                                                                                            |                                                                       | QUOTE #:                                                                   |              |                                                               |                                               |
| FAX:                                                                                                                                              |                                                                       | SAMPLER (Initials):                                                        |              |                                                               |                                               |
| Lab Work Order # 1780819                                                                                                                          |                                                                       |                                                                            |              |                                                               |                                               |
| Sample #                                                                                                                                          | SAMPLE IDENTIFICATION<br>(This description will appear on the report) | DATE                                                                       | TIME         | SAMPLE TYPE                                                   |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 25-4-2009                                                                  | 8:20         | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 25-4-2009                                                                  | 10:10        | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 25-4-2009                                                                  | 11:20        | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 25-4-2009                                                                  | 13:20        | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 26-4-2009                                                                  | 8:40         | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 26-4-2009                                                                  | 9:15         | Soil                                                          |                                               |
|                                                                                                                                                   | Soil 1 Samples                                                        | 26-4-2009                                                                  | 11:30        | Soil                                                          |                                               |
| GUIDELINES / REGULATIONS                                                                                                                          |                                                                       |                                                                            |              |                                                               | SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS      |
| Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.                                               |                                                                       |                                                                            |              |                                                               |                                               |
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| RELINQUISHED BY:                                                                                                                                  | DATE & TIME:                                                          | RECEIVED BY:                                                               | DATE & TIME: | TEMPERATURE                                                   | SAMPLE CONDITION (lab use only)               |
|                                                                                                                                                   |                                                                       | HD 09/06/19                                                                | 10:59        |                                                               | SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO |
| RELINQUISHED BY:                                                                                                                                  | DATE & TIME:                                                          | RECEIVED BY:                                                               | DATE & TIME: |                                                               | (If no provide details)                       |



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**ANEXO XIX**

**APÉNDICE C**

**Concentraciones Ambientales para Utilización en  
Modelos ERSHE**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**



## **1 RESUMEN**

Los datos de calidad ambiental medidos y pronosticados (es decir suelo, sedimento, agua superficial, tejido de peces, productos agrícolas y aire) se evaluaron mediante su comparación con valores normativos relevantes y aplicables y con la calidad de la línea base. Los químicos de interés potencial (CIP) se identificaron como aquellas sustancias que excedieron el valor normativo más bajo y además mostraron un incremento del 10% o más sobre la concentración media de la línea base en cualquier lugar. Se consideró la comparación con los valores indicados en las normas con el fin de representar una evaluación conservadora del potencial para las concentraciones pronosticadas y así extraer los efectos adversos. Se consideró que la comparación con las concentraciones del 10% por encima de las de la línea base representaban una evaluación conservadora en cuanto a la probabilidad de ocurrencia de un impacto medible relacionado con el Proyecto en relación a la calidad ambiental. Debido a la variabilidad temporal, la variabilidad en los métodos de muestreo y los análisis de laboratorio, y la incertidumbre inherente en los modelos para pronosticar la calidad del agua, aire y suelo, se consideró improbable que cualquier incremento pronosticado por encima del 10% de la línea base reflejase un cambio real relacionado con el Proyecto en la calidad ambiental. En este apéndice se resume la forma cómo se generaron los datos de exposición (es decir medidos o pronosticados) y la forma cómo se evaluaron (es decir estadísticas utilizadas con el fin de generar concentraciones de exposición) para los CIP, según se identificaron anteriormente, en su utilización en la evaluación del riesgo para la salud humana y la ecología (ERSHE). El apéndice se estructura tal como se indica a continuación: en la Sección 2.0 se resume las concentraciones de exposición generadas para el caso de la línea base, en la Sección 3.0 se proporciona información sobre los factores de bioacumulación que se utilizaron para generar los datos del caso de impacto y en la Sección 4.0 se resume las concentraciones de exposición generadas por el caso de impacto.

## **2 CONCENTRACIONES DE LA LÍNEA BASE**

### **2.1 SUELO, SEDIMENTO, AGUA Y PECES**

Las muestras ambientales se recolectaron en varias matrices (suelo, agua, plantas, etc.) en el área de estudio entre octubre de 2008 y abril de 2009. En el Anexo XIX, Apéndice A se describe los métodos de trabajo de campo y en el Anexo XIX, Apéndice B se incluye los informes de laboratorio. Los datos ambientales específicos para el área se utilizaron con el fin de representar las condiciones de la línea base en el área de estudio y también como una base para pronosticar las concentraciones de impacto. La frecuencia de detección se calculó para cada parámetro y los valores no detectados se reemplazaron por el límite de detección de laboratorio previo al cálculo de las concentraciones de exposición de la línea base.

Las concentraciones de exposición del límite superior (es decir escenario razonable del peor caso) en cada matriz ambiental se estimaron como el percentil 90 de todos los datos. Con el fin de disponer de un contexto para los estimados de exposición del límite superior, los cálculos se efectuaron también tomando como base las tendencias centrales estimadas de concentraciones de CIP en cada matriz. La diferencia entre los estimados de límite superior y de tendencia central (promedio o típicos) proporciona una indicación de la variabilidad de los datos de exposición. Las concentraciones de la tendencia central se estimaron como la concentración media en casos donde más de la mitad de los resultados se detectaron por encima de los límites de detección del laboratorio (es decir frecuencia de detección > 50%). En las Tablas 1 a 7 se resume las estadísticas y las concentraciones de exposición para cada matriz.

### **2.2 AIRE**

Con el fin de determinar con exactitud las concentraciones a nivel del suelo en las comunidades del área de estudio se requiere determinar las emisiones de las actividades que ocurren dentro de las comunidades. Para ello se utilizó un método consistente en calcular las emisiones de las actividades locales e incluirlas en el modelado, sin embargo la información acerca de las actividades de las comunidades como la cantidad de vehículos y la distancia desde la comunidad es con frecuencia difícil de estimar. En consecuencia los datos de monitoreo de la calidad del aire disponibles de Río Caimito ( $MP_{10}$  y metales) se utilizaron para estimar las concentraciones de fondo de la comunidad; también se dispone de los datos de monitoreo del campamento Colina, sin embargo las actividades previas al Proyecto tales como la construcción del camino influyeron en gran medida en las lecturas y no se les consideró representativas de las condiciones de fondo (ver evaluación de impacto en la calidad del aire, Capítulo 9, Sección 9.1.8).

Las concentraciones de aire de fondo (es decir de la línea base) se estimaron en ubicaciones adicionales en el área de estudio mediante la adaptación de los datos del río Caimito según la población para cada una de las comunidades. Las concentraciones utilizadas en la ERSHE de la línea base son las siguientes:

- 1) **Receptores Costeros:** concentraciones de fondo en el río Caimito.
- 2) **Receptores Agrícolas:** concentraciones de fondo para las tres comunidades agrícolas Los Molejones, San Benito y Coclesito (concentración promedio utilizada para la tendencia central, concentración máxima utilizada para el modelo de límite superior).
- 3) **Receptores Indígenas:** concentraciones de fondo para las dos comunidades indígenas Nueva Lucha y Nuevo Sinaí (concentración promedio utilizada para la tendencia central, concentración máxima utilizada para el modelo de límite superior).

## 2.3 HOJAS, FRUTAS, PRODUCTOS AGRÍCOLAS E INVERTEBRADOS

Para algunas matrices (hojas, frutas, arroz e invertebrados), los datos disponibles se consideraron insuficientes con el fin de proporcionar estimados confiables de las concentraciones en el lugar debido al tamaño pequeño de la muestra y/o a la muy baja frecuencia de detección con límites de detección elevados en algunos casos. En consecuencia las concentraciones de la línea base para estas matrices se estimaron con los datos del suelo recolectados en el área de estudio y los factores de bioacumulación (FBA). El FBA corresponde a la proporción de concentración entre planta/fruta/tejido y suelo, por ejemplo las concentraciones de límite superior se estimaron como concentración de suelo de límite superior multiplicada por el FBA para dicho parámetro. Cuando fue posible, los FBA se derivaron utilizando datos específicos del área y los valores obtenidos del material bibliográfico se sustituyeron cuando no se dispuso de información suficiente sobre el área (ver Sección 2.0). En las Tablas 8 y 9 se resume las concentraciones de la línea base utilizadas en la evaluación del riesgo para la salud humana y la ecología (ERSHE) para la tendencia central y el límite superior respectivamente.

## 2.4 GANADO

Las concentraciones en el tejido de vacunos (vacas) y pollos se pronosticaron utilizando un modelo de cadena alimenticia según el cual se estimó para cada animal la ingesta diaria total (mg/kg-día) y se multiplicó por un factor de transferencia de bioacumulación (Baes 1984), la metodología del modelo se describe en mayor detalle

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en el Anexo XIX, Apéndice G. Las siguientes concentraciones ambientales se utilizaron como parámetros de exposición en los modelos de ganado de la línea base:

- concentraciones de suelo en la línea base;
- las concentraciones de agua de la línea base (se utilizó agua de la comunidad); y
- arroz, invertebrados y hojas de la línea base.

Se debe aquí tener en cuenta el hecho de que los valores de tendencia central se utilizaron con el fin de pronosticar las concentraciones de tendencia central en el ganado mientras que las concentraciones ambientales de límite superior se utilizaron para pronosticar las concentraciones de ganado de límite superior. Las concentraciones en vacuno y pollo utilizadas en los modelos ERSHE se resumen en las Tablas 8 (tendencia central) y 9 (límite superior).



### 3 FACTORES DE BIOACUMULACIÓN

Las concentraciones de línea base e impacto para hojas, frutas, productos agrícolas (arroz y yuca/guineo para seres humanos) e invertebrados se estimaron utilizando el FBA. El FBA corresponde a la proporción de concentración entre planta/fruta/tejido y suelo. Con frecuencia la relación entre el suelo y el tejido se representa mejor por una ecuación, comúnmente como la regresión lineal del tejido y las concentraciones de suelo en forma de logaritmo (ver ítem 1 a continuación).

Cuando fue posible, se utilizaron los datos del área con el fin de generar FBA específicos del área para cada matriz y sólo se consideraron los datos detectados que ocurrieron en forma simultánea (es decir datos de suelo y tejido recolectados en el mismo lugar al mismo tiempo) para derivar los FBA. Se utilizaron las siguientes reglas para la selección de los FBA:

- 1) cuando se dispuso de más de cinco pares de datos detectados, se efectuó una regresión lineal utilizando las concentraciones de tejido y suelo en forma de logaritmo. Si los resultados de la regresión se consideraron significativos (es decir  $p\text{-valor} < 0.05$ ) y cumplieron con los supuestos de la regresión lineal, entonces la ecuación de regresión se retuvo como el FBA para dicho parámetro (por ejemplo  $\log C_{\text{tejido}} = \log C_{\text{suelo}}(x) + b$ ). Si los resultados no se consideraron como significativos, entonces se mantuvo como el FBA el cociente promedio o medio de la concentración tejido a suelo (ver punto (2) más adelante)
- 2) cuando se dispuso de por lo menos un par de datos detectados, el cociente de concentración de tejido (hoja, fruta, arroz o invertebrado) y concentración de suelo se calculó para cada par de datos correspondiente. Se calcularon los cocientes medio y mediano y se seleccionó el valor más alto (medio o mediano) como FBA para el parámetro
- 3) cuando no se dispuso para un parámetro-matriz de ningún dato detectado, se adoptaron los valores de FBA suministrados por material bibliográfico. Los FBA del material bibliográfico para hojas (cocientes de absorción suelo a planta,  $B_v$ ) se obtuvieron a partir de la base de datos de los Sistema de Información de la Evaluación del Riesgo (RAIS) (RAIS 2010). En el caso de las frutas y productos agrícolas se seleccionó como FBA los cocientes de absorción suelo a planta para las partes no vegetales de las plantas según Baes. (1984), y los factores de bioacumulación se extrajeron de los documentos EcoSSL de US EPA (US EPA 2007).

En las Tablas 10 a 12 se resume los FBA seleccionados para la ERSHE.

## **4 CONCENTRACIONES DE IMPACTO**

Las concentraciones de impacto en el área se pronosticaron según los datos de deposición de aire y modelamiento de la calidad del agua (Capítulo 9, Secciones 9.1.8 y 9.1.7, respectivamente). Los métodos utilizados con el fin de determinar las concentraciones de la exposición al impacto para cada matriz se describen a continuación y las concentraciones de exposición utilizadas en los modelos de impacto de la ERSHE se resumen en las Tablas 13 a 16.

### **4.1 AGUA**

Las concentraciones de impacto en el agua dulce se pronosticaron en quince ubicaciones del área de estudio y las metodologías y pronósticos de calidad del agua se describen en forma más detallada en la Sección 9.1.7. Se estimó las concentraciones promedio en cada ubicación para determinados momentos desde los primeros años de operación de la mina (años 0 a 4) a post-cierre (>54 años). En la ERSHE la concentración promedio máxima en el tiempo se seleccionó en forma conservadora a fin de representar las condiciones de impacto en cada ubicación.

Las concentraciones de exposición utilizadas en las evaluaciones de riesgo corresponden a las siguientes:

- 1) evaluación del riesgo ecológico: se seleccionó la concentración media para todas las ubicaciones como la tendencia central y se seleccionó la concentración del percentil 90 como la concentración de exposición de límite superior
- 2) evaluación del riesgo a la salud humana: se pronosticó las concentraciones de exposición por separado para dos grupos de receptores, comunidades indígenas y comunidades agrícolas. En cada grupo receptor se utilizó las concentraciones pronosticadas en el agua superficial en ubicaciones cercanas a las comunidades receptoras con el fin de estimar la concentración de exposición (un total de cuatro ubicaciones para cada receptor). Se utilizó las concentraciones promedio y máximas en estas ubicaciones con el fin de representar la tendencia central y las concentraciones de límite superior, respectivamente y se utilizó la concentración máxima en lugar del percentil 90 para el estimado del límite superior debido al pequeño tamaño de la muestra (sólo cuatro concentraciones pronosticadas en cada ubicación). Los receptores costeros en la comunidad de Río Caimito se evaluaron en la ERSHE, sin embargo se asumió que estos receptores entrarían en contacto con el agua de mar en lugar del agua dulce durante las actividades recreacionales (es decir nado), por lo que para este grupo de receptores no se estimaron las concentraciones de agua dulce.

En la ERSHE se supuso que las actividades mineras no impactaron en forma significativa el agua de mar y el suministro de agua de la comunidad (Capítulo 9, Sección 9.1.7) y en consecuencia, para estas matrices se conservaron las concentraciones de la línea base.

## **4.2 PECES**

Las concentraciones de agua pronosticadas se utilizaron como base para estimar concentraciones de impacto en los peces de agua dulce. En cada una de las quince ubicaciones de agua superficial modeladas, se calculó un cociente de incremento dividiendo la concentración de impacto pronosticada (concentración máxima en el tiempo) entre la concentración de la línea base en esta ubicación. Los cocientes de incremento entonces se utilizaron para calcular las concentraciones de peces pronosticadas en cada lugar, utilizando la siguiente ecuación:

$$\text{concentraciones de impacto en los peces} = \text{concentración en los peces de línea base} \times \text{cociente de incremento}$$

Las concentraciones de peces de la línea base en la tendencia central se utilizaron para pronosticar las concentraciones de impacto en la misma tendencia mientras que las concentraciones de la línea base del límite superior se utilizaron para pronosticar las concentraciones de impacto del límite superior para los peces.

Las concentraciones de exposición para uso en las evaluaciones de riesgo se calcularon de la misma manera que para el agua (es decir media y percentil 90 para los receptores ecológicos y media y máxima de las concentraciones específicas de la comunidad para los seres humanos) y se supuso que los receptores costeros consumen peces del ambiente marino. Ya que no se pronosticó incrementos en las concentraciones del agua de mar, se supuso que los peces de mar tienen las mismas concentraciones que en el escenario de la línea base.

## **4.3 SEDIMENTO**

No se supuso que las concentraciones en el sedimento cambiasen en forma significativa entre los escenarios de la línea base y de impacto (Capítulo 9, Sección 9.1.7) y por lo tanto las concentraciones de la línea base se utilizaron para el sedimento en los modelos de impacto.

#### **4.4 AIRE**

El Equipo de Aire estimó las concentraciones de CIP en el aire para el escenario de impacto mediante el uso de modelos predictivos. Las concentraciones de impacto se basaron en las concentraciones de fondo en el aire (Sección 2.2 de este Apéndice) más la contribución adicional pronosticada de las actividades mineras. Las concentraciones de impacto en el aire y las tasas de deposición asociadas para los metales y PAH se pronosticaron en trece lugares del área de estudio, incluyendo Río Caimito y varias comunidades agrícolas e indígenas. Las tasas de deposición se utilizaron para pronosticar las concentraciones de impacto en el suelo y la vegetación en cada ubicación (Secciones 3.5 y 3.6). En la Sección 9.1.8 se proporciona información más detallada con respecto a la metodología de modelado.

Las concentraciones de exposición utilizadas en el modelo de impacto de la ERSHE corresponden a las siguientes:

- receptores costeros: concentración pronosticada en el Río Caimito utilizada para la concentración de exposición, debido a que se dispuso de sólo una ubicación, se utilizó el mismo valor para los modelos de tendencia central y límite superior
- receptores agrícolas: las concentraciones pronosticadas en San Benito, Los Molejones y Coclesito se utilizaron para estimar la exposición, se utilizó una concentración promedio para el estimado de tendencia central y la concentración máxima para el estimado del límite superior
- receptores indígenas: las concentraciones pronosticadas en Nueva Lucha y Nuevo Sinaí se utilizaron para estimar la exposición, se utilizó una concentración promedio para el estimado de tendencia central y la concentración máxima para el estimado del límite superior
- receptores del límite del área ocupada por el Proyecto: la concentración pronosticada en los alrededores del cerco perimetral se utilizó con el fin de evaluar los riesgos para los receptores recreacionales en esta área, debido a que se dispuso de sólo una ubicación, el mismo valor se utilizó para los modelos de tendencia central y límite superior

#### **4.5 SUELO**

Las concentraciones de impacto de los CIP en el suelo se pronosticaron en varias ubicaciones del área de estudio para su uso en la ERSHE, la concentración de impacto pronosticada en el suelo se estimó como:

Concentración de impacto = concentración de la línea base + concentración incremental debido a la deposición atmosférica.

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Las tasas de deposición se pronosticaron en trece ubicaciones del área de estudio (Sección 3.4) y se utilizaron para calcular las concentraciones incrementales en el suelo debido a la deposición atmosférica. Para calcular las concentraciones incrementales en el suelo se utilizó la siguiente ecuación, extraída de la US EPA (2005, Capítulo 5):

$$Cs = \frac{100 \times (D_{yd} + D_{yw}) \times tD}{Zs \times BD}$$

donde:

- Cs = concentración incremental en el suelo debido a la deposición relacionada con la mina
- D<sub>yd</sub> = tasa de deposición seca anual de contaminantes (g/m<sup>2</sup>-año), específica del Proyecto
- D<sub>yw</sub> = tasa de deposición húmeda anual de contaminantes (g/m<sup>2</sup>-año), específica del Proyecto
- tD = período de tiempo durante el cual ocurre la deposición (años), se supone 30 años (específico del Proyecto)
- Zs = profundidad de mezcla de suelos (en cm), 2 cm (suelo sin cultivar, US EPA 2005)
- BD = densidad aparente del suelo (g/cm<sup>3</sup>), 1.5 g/cm<sup>3</sup> (US EPA 2005)

Las tasas de deposición se extrajeron de los resultados del modelado del aire (Sección 3.4). y se supuso que la deposición en el suelo ocurrirá durante toda la fase de operaciones de la mina (es decir tD = 30 años).

Las concentraciones de impacto se calcularon tres veces en cada ubicación, la primera utilizando la concentración máxima de la línea base (resultados utilizados para el análisis de CIP), la segunda utilizando las concentraciones de la línea base de tendencia central (para el cálculo de la concentración de impacto de la tendencia central) y la tercera utilizando las concentraciones de la línea base del límite superior (para el cálculo de las concentraciones de suelo de límite superior).

Las concentraciones de exposición utilizadas en los modelos ERSHE corresponden a las siguientes:

- 1) receptores ecológicos: la concentración media de impacto tomando como base la tendencia central, utilizada como tendencia central y percentil 90 de la concentración de impacto basada en el límite superior, utilizada como la concentración de exposición de límite superior.

- 2) receptores humanos: los riesgos se evaluaron por separado para las comunidades costeras, agrícolas e indígenas. Las concentraciones de impacto en el suelo en el Río Caimito se utilizaron con el fin de evaluar a los receptores costeros, las concentraciones en San Benito, Los Molejones y Coclesito con el fin de evaluar a los receptores agrícolas (promedio para la tendencia central y máxima para las concentraciones de límite superior) y las concentraciones en Nueva Lucha y Nuevo Sinaí con el fin de evaluar a los receptores indígenas (promedio para la tendencia central y máxima para las concentraciones de límite superior). Adicionalmente las concentraciones de impacto pronosticadas en los alrededores del cerco perimetral se utilizaron con el fin de evaluar los riesgos para los receptores recreacionales en esta área.

#### 4.6 HOJAS, FRUTA Y PRODUCTOS AGRÍCOLAS (ARROZ, YUCA/GUINEO)

Las concentraciones en hojas, frutas (en relación a la evaluación del riesgo para la ecología) y en los productos agrícolas (en relación a la evaluación del riesgo para la salud humana) se pronosticaron a través de la siguiente ecuación:

concentración de impacto = concentración de impacto en el suelo x BAF + deposición de partículas

El cálculo de las concentraciones de impacto en el suelo se describe en la Sección 3.5 y el procedimiento para seleccionar el FBA se describe en la Sección 2.0. La deposición de partículas se calculó utilizando las tasas de deposición pronosticadas (Sección 3.4) y la ecuación proporcionada en US EPA (2005):

$$Pd = \frac{1000 \times (D_{yd} + (Fw \times D_{wyd})) \times R_p \times (1.0 - \exp(-k_p \times T_p))}{Y_p \times k_p}$$

donde:

- Pd = concentración incremental debido a la deposición del aire (mg/kg peso seco)  
 D<sub>yd</sub> = tasa de deposición de partículas secas (g/m<sup>2</sup>/a), específica del Proyecto  
 Fw = fracción de deposición húmeda de CIP que se adhiere a la superficie de la planta  
 D<sub>wyd</sub> = tasa de deposición húmeda (g/m<sup>2</sup>/a), específica del Proyecto  
 R<sub>p</sub> = fracción de interceptación, representa una porción de la deposición química interceptada por las plantas, 0.39 para bayas/frutas/vegetales (US EPA 2005)  
 Y<sub>p</sub> = producción agrícola (kg peso seco/m<sup>2</sup>), 0.25 (US EPA 2005)  
 T<sub>p</sub> = duración de la exposición de la planta a la deposición por cosecha, 0.16 (US EPA 2005)  
 k<sub>p</sub> = remoción química de la superficie de la planta por efecto de la intemperie (año<sup>-1</sup>), 18 para todas las plantas (US EPA 2005)

Las tasas de deposición se obtuvieron del ejercicio de modelado del aire (Sección 3.2) y las variables restantes corresponden a valores por defecto asignados tomando como base los recomendados por US EPA (2005) para productos agrícolas y hojas comestibles. Las concentraciones de impacto para cada una de las matrices se estimaron para las trece ubicaciones en las que se dispuso de los datos de suelo pronosticados. Las concentraciones de exposición para utilizar en los modelos de la ERSHE se determinaron de la misma manera que para el suelo (es decir promedio y percentil 90 en los receptores ecológicos y concentraciones específicas del área en los grupos de receptores humanos).

#### **4.7 INVERTEBRADOS**

Las concentraciones en invertebrados se pronosticaron utilizando concentraciones de impacto en suelos y FBA y las concentraciones de impacto para estas matrices se estimaron como sigue:

$$\text{concentración de impacto} = \text{concentración de impacto en el suelo} \times \text{FBA}$$

El procedimiento para seleccionar FBA se describe en la Sección 2.0 y las concentraciones de impacto para cada una de las matrices se estimaron para las trece ubicaciones en las que se dispuso de los datos de suelo pronosticados. Las concentraciones de exposición para uso en los modelos de la ERSHE se determinaron de la misma manera que para el suelo (es decir promedio y percentil 90 en los receptores ecológicos y concentraciones específicas del área en los grupos de receptores humanos).

#### **4.8 GANADO (PARA ERSHE)**

Las concentraciones en el tejido de vacunos (vacas) y pollos se estimaron utilizando un modelo de cadena alimenticia (ver Anexo XIX, Apéndice G) utilizando para ello el mismo método que para la evaluación de la línea base. Las siguientes concentraciones ambientales se utilizaron como parámetros de exposición para el ganado en las regiones agrícolas e indígenas.

Receptores agrícolas:

- concentración de impacto en el suelo para receptores agrícolas;
- concentraciones en el suministro de agua de la comunidad (iguales en la línea base, supuestas sin cambio para el impacto); y

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- concentraciones de impacto en el arroz, invertebrados y hojas (concentraciones de impacto pronosticadas para los receptores agrícolas: datos de Los Molejones, Coclesito y San Benito).

## Receptores indígenas:

- concentración de impacto en el suelo para receptores indígenas (es decir en Nueva Lucha y Nuevo Sinaí);
- concentraciones de impacto en el agua superficial para los receptores indígenas; y
- concentraciones de impacto en el arroz, invertebrados y hojas (concentraciones de impacto pronosticadas para los receptores indígenas: datos de Nueva Lucha y Nuevo Sinaí).

Debe aquí tenerse en cuenta que los valores de tendencia central de todas las matrices se utilizaron con el fin de pronosticar las concentraciones de tendencia central en el ganado mientras que las concentraciones de límite superior se utilizaron con el fin de pronosticar las concentraciones de límite superior en el ganado. Se supuso que los receptores costeros (es decir residentes de Río Caimito) obtuvieron sus productos cárnicos de la región agrícola.



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Tabla 1      Resumen de las Estadísticas para los COPC en el Suelo Utilizado para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|----|--------------------------------------------|----------|---------|--------------|--------|------------------------------------|----------------------------------|
| Aluminio  | 17 | 100%                                       | 31476    | 30500   | 43560        | 60600  | 31476                              | 43560                            |
| Antimonio | 24 | 0%                                         | 10.0     | 10      | 10           | 10     | 10.0                               | 10                               |
| Arsénico  | 24 | 8%                                         | 5.0      | 5       | 5            | 5.5    | 5.00                               | 5                                |
| Bario     | 24 | 100%                                       | 67.1     | 42.2    | 142.4        | 251    | 67.1                               | 142                              |
| Cadmio    | 24 | 29%                                        | 0.6      | 0.5     | 1.027        | 1.25   | 0.50                               | 1.03                             |
| Cromo     | 24 | 92%                                        | 74.2     | 19.8    | 248.5        | 482    | 74.2                               | 249                              |
| Cobalto   | 24 | 58%                                        | 13.5     | 7.9     | 27.29        | 62.1   | 13.5                               | 27.3                             |
| Cobre     | 24 | 100%                                       | 241      | 117     | 631.3        | 1050   | 241                                | 631                              |
| Hierro    | 17 | 100%                                       | 53587    | 50800   | 113200       | 126000 | 53587                              | 113200                           |
| Plomo     | 24 | 8%                                         | 34.5     | 30      | 30           | 111    | 30.0                               | 30                               |
| Manganeso | 17 | 100%                                       | 671.6    | 227     | 1994         | 2610   | 672                                | 1994                             |
| Mercurio  | 24 | 100%                                       | 0.1      | 0.108   | 0.1558       | 0.18   | 0.11                               | 0.156                            |
| Molibdeno | 24 | 33%                                        | 34.0     | 4       | 41.31        | 493    | 4.00                               | 41.3                             |
| Níquel    | 24 | 46%                                        | 8.4      | 5       | 18.33        | 26.3   | 5.00                               | 18.3                             |
| Selenio   | 24 | 4%                                         | 2.8      | 2       | 4.4          | 7      | 2.00                               | 4.4                              |
| Estroncio | 17 | 100%                                       | 6.2      | 5.14    | 10.68        | 18     | 6.25                               | 10.7                             |
| Vanadio   | 24 | 100%                                       | 162      | 148     | 382.1        | 457    | 162                                | 382                              |
| Zinc      | 24 | 100%                                       | 57.5     | 38      | 114.7        | 217    | 57.5                               | 115                              |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 2      Resumen de las Estadísticas para los COPC en el Sedimento de Agua Dulce Utilizado para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|----|--------------------------------------------|----------|---------|--------------|--------|------------------------------------|----------------------------------|
| Aluminio  | 57 | 100%                                       | 16096    | 14900   | 25200        | 54800  | 16096                              | 25200                            |
| Antimonio | 57 | 0%                                         | 1.84     | 0.1     | 10           | 10     | 0.1                                | 10                               |
| Arsénico  | 57 | 82%                                        | 3.38     | 2.3     | 10           | 10     | 3.38                               | 10                               |
| Bario     | 57 | 100%                                       | 93.7     | 76      | 147.2        | 511    | 93.7                               | 147.2                            |
| Cadmio    | 57 | 19%                                        | 0.276    | 0.2     | 0.5          | 0.7    | 0.2                                | 0.5                              |
| Cromo     | 57 | 96%                                        | 30.6     | 19      | 48.6         | 310    | 30.6                               | 48.6                             |
| Cobalto   | 57 | 100%                                       | 16.6     | 15      | 27           | 112    | 16.6                               | 27                               |
| Cobre     | 57 | 100%                                       | 137      | 66      | 276.8        | 988    | 137                                | 277                              |
| Hierro    | 57 | 100%                                       | 41388    | 45100   | 62180        | 80800  | 41388                              | 62180                            |
| Plomo     | 57 | 98%                                        | 10.5     | 6.5     | 17.92        | 70.8   | 10.5                               | 17.9                             |
| Manganeso | 57 | 100%                                       | 733      | 648     | 1134         | 3910   | 733                                | 1134                             |
| Mercurio  | 57 | 61%                                        | 0.0168   | 0.01    | 0.03         | 0.07   | 0.0168                             | 0.03                             |
| Molibdeno | 57 | 89%                                        | 4.66     | 1.5     | 9.92         | 37     | 4.66                               | 9.92                             |
| Níquel    | 57 | 81%                                        | 7.59     | 5       | 12.4         | 66     | 7.59                               | 12.4                             |
| Selenio   | 57 | 67%                                        | 0.958    | 0.6     | 2            | 7.2    | 0.958                              | 2                                |
| Estroncio | 57 | 100%                                       | 14.4     | 11      | 27.4         | 67     | 14.4                               | 27.4                             |
| Vanadio   | 57 | 100%                                       | 107      | 104     | 166          | 293    | 107                                | 166                              |
| Zinc      | 57 | 100%                                       | 79.4     | 65      | 147          | 252    | 79.4                               | 147                              |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 3      Resumen de las Estadísticas para los COPC en el Sedimento Marino y Estuarino Utilizado para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|----|--------------------------------------------|----------|---------|--------------|--------|------------------------------------|----------------------------------|
| Aluminio  | 14 | 100%                                       | 6357     | 6540    | 7864         | 8830   | 6357                               | 7864                             |
| Antimonio | 14 | 0%                                         | 4.34     | 0.1     | 10           | 10     | 0.1                                | 10                               |
| Arsénico  | 14 | 86%                                        | 10.5     | 10.05   | 13           | 14     | 10.5                               | 13                               |
| Bario     | 14 | 100%                                       | 5.29     | 5       | 7.7          | 8      | 5.29                               | 7.7                              |
| Cadmio    | 14 | 0%                                         | 0.33     | 0.2     | 0.5          | 0.5    | 0.2                                | 0.5                              |
| Cromo     | 14 | 57%                                        | 18.9     | 18      | 33.1         | 38     | 18.9                               | 33.1                             |
| Cobalto   | 14 | 0%                                         | 10.1     | 10.5    | 14.7         | 15     | 10.1                               | 14.7                             |
| Cobre     | 14 | 100%                                       | 8.57     | 8.5     | 10           | 11     | 8.57                               | 10                               |
| Hierro    | 14 | 100%                                       | 24571    | 23900   | 40070        | 46000  | 24571                              | 40070                            |
| Plomo     | 14 | 100%                                       | 3        | 1.9     | 5            | 6      | 3                                  | 5                                |
| Manganeso | 14 | 100%                                       | 353.5    | 380     | 448          | 485    | 354                                | 448                              |
| Mercurio  | 14 | 100%                                       | 0.01     | 0.01    | 0.01         | 0.01   | 0.01                               | 0.01                             |
| Molibdeno | 14 | 64%                                        | 1.84     | 0.25    | 4            | 4      | 1.84                               | 4                                |
| Níquel    | 14 | 100%                                       | 6.14     | 6       | 8.7          | 9      | 6.14                               | 8.7                              |
| Selenio   | 14 | 100%                                       | 0.971    | 0.2     | 2            | 2      | 0.2                                | 2                                |
| Estroncio | 14 | 57%                                        | 70.1     | 71      | 98.8         | 107    | 70.1                               | 98.8                             |
| Vanadio   | 14 | 57%                                        | 98.2     | 91.5    | 180.4        | 251    | 98.2                               | 180.4                            |
| Zinc      | 14 | 100%                                       | 38.3     | 38      | 57.9         | 74     | 38.3                               | 57.9                             |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 4      Resumen de las Estadísticas para los COPC en el Agua Utilizada para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N   | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo  | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|-----|--------------------------------------------|----------|---------|--------------|---------|------------------------------------|----------------------------------|
| Aluminio  | 149 | 100%                                       | 0.438    | 0.12    | 0.794        | 17.9    | 0.438                              | 0.794                            |
| Antimonio | 150 | 0%                                         | 0.00058  | 0.0002  | 0.001        | 0.001   | 0.0002                             | 0.001                            |
| Arsénico  | 150 | 2%                                         | 0.00059  | 0.0002  | 0.001        | 0.0015  | 0.0002                             | 0.001                            |
| Bario     | 150 | 100%                                       | 0.0165   | 0.015   | 0.0216       | 0.152   | 0.0165                             | 0.0216                           |
| Cadmio    | 150 | 5%                                         | 0.000120 | 0.00011 | 0.0002       | 0.0002  | 0.00011                            | 0.0002                           |
| Cromo     | 150 | 20%                                        | 0.000639 | 0.00075 | 0.001        | 0.0029  | 0.00075                            | 0.001                            |
| Cobalto   | 150 | 21%                                        | 0.000792 | 0.001   | 0.001        | 0.018   | 0.001                              | 0.001                            |
| Cobre     | 150 | 91%                                        | 0.00561  | 0.00235 | 0.012        | 0.101   | 0.00561                            | 0.012                            |
| Hierro    | 150 | 97%                                        | 0.440    | 0.27    | 0.573        | 12.7    | 0.440                              | 0.573                            |
| Plomo     | 150 | 10%                                        | 0.000689 | 0.0004  | 0.001        | 0.006   | 0.0004                             | 0.001                            |
| Manganeso | 150 | 100%                                       | 0.0354   | 0.018   | 0.0562       | 1.09    | 0.0354                             | 0.0562                           |
| Mercurio  | 150 | 1%                                         | 0.00002  | 0.00002 | 0.00002      | 0.00002 | 0.00002                            | 0.00002                          |
| Molibdeno | 150 | 35%                                        | 0.000396 | 0.0005  | 0.0006       | 0.0015  | 0.0005                             | 0.0006                           |
| Níquel    | 150 | 13%                                        | 0.000613 | 0.0006  | 0.001        | 0.0026  | 0.0006                             | 0.001                            |
| Selenio   | 150 | 12%                                        | 0.000669 | 0.00035 | 0.001        | 0.003   | 0.00035                            | 0.001                            |
| Estroncio | 150 | 100%                                       | 0.0352   | 0.029   | 0.0441       | 0.881   | 0.0352                             | 0.0441                           |
| Vanadio   | 150 | 69%                                        | 0.00143  | 0.001   | 0.002        | 0.024   | 0.00143                            | 0.002                            |
| Zinc      | 150 | 52%                                        | 0.00424  | 0.005   | 0.005        | 0.046   | 0.00424                            | 0.005                            |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 5      Resumen de las Estadísticas para los COPC en el Agua Potable Utilizada para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo  | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|----|--------------------------------------------|----------|---------|--------------|---------|------------------------------------|----------------------------------|
| Aluminio  | 16 | 100%                                       | 0.0686   | 0.061   | 0.115        | 0.17    | 0.0686                             | 0.115                            |
| Antimonio | 16 | 0%                                         | 0.0002   | 0.0002  | 0.0002       | 0.0002  | 0.0002                             | 0.0002                           |
| Arsénico  | 16 | 19%                                        | 0.000213 | 0.0002  | 0.00025      | 0.0003  | 0.0002                             | 0.00025                          |
| Bario     | 16 | 100%                                       | 0.0158   | 0.011   | 0.031        | 0.0325  | 0.0158                             | 0.031                            |
| Cadmio    | 16 | 25%                                        | 5.56E-05 | 0.00004 | 0.000105     | 0.00012 | 0.00004                            | 0.000105                         |
| Cromo     | 16 | 19%                                        | 0.000306 | 0.0002  | 0.00045      | 0.0014  | 0.0002                             | 0.00045                          |
| Cobalto   | 16 | 13%                                        | 0.000363 | 0.0002  | 0.00025      | 0.0027  | 0.0002                             | 0.00025                          |
| Cobre     | 16 | 100%                                       | 0.00391  | 0.0006  | 0.0059       | 0.038   | 0.00391                            | 0.0059                           |
| Hierro    | 16 | 100%                                       | 0.0816   | 0.075   | 0.175        | 0.25    | 0.0816                             | 0.175                            |
| Plomo     | 16 | 13%                                        | 0.000338 | 0.0002  | 0.0004       | 0.002   | 0.0002                             | 0.0004                           |
| Manganeso | 16 | 100%                                       | 0.0153   | 0.0017  | 0.06         | 0.101   | 0.0153                             | 0.06                             |
| Mercurio  | 16 | 0%                                         | 0.00002  | 0.00002 | 0.00002      | 0.00002 | 0.00002                            | 0.00002                          |
| Molibdeno | 16 | 0%                                         | 0.0001   | 0.0001  | 0.0001       | 0.0001  | 0.0001                             | 0.0001                           |
| Níquel    | 16 | 25%                                        | 0.000294 | 0.0002  | 0.00055      | 0.0007  | 0.0002                             | 0.00055                          |
| Selenio   | 16 | 19%                                        | 0.000294 | 0.0002  | 0.00065      | 0.0008  | 0.0002                             | 0.00065                          |
| Estroncio | 16 | 100%                                       | 0.0278   | 0.0225  | 0.04175      | 0.086   | 0.0278                             | 0.04175                          |
| Vanadio   | 16 | 94%                                        | 0.000594 | 0.00035 | 0.0011       | 0.0013  | 0.000594                           | 0.0011                           |
| Zinc      | 16 | 75%                                        | 0.007    | 0.002   | 0.021        | 0.037   | 0.007                              | 0.021                            |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 6      Resumen de las Estadísticas para los COPC en los Peces de Agua Dulce Utilizados para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo | Tendencia<br>Central (para<br>modelo) | Límite Superior<br>(para modelo) |
|-----------|----|-----------------------------------------|----------|---------|--------------|--------|---------------------------------------|----------------------------------|
| Aluminio  | 62 | 95%                                     | 98.7     | 10.2    | 165.4        | 1390   | 98.7                                  | 165.4                            |
| Antimonio | 62 | 2%                                      | 0.014    | 0.010   | 0.02         | 0.03   | 0.01                                  | 0.02                             |
| Arsénico  | 62 | 73%                                     | 0.488    | 0.103   | 1.75         | 2.29   | 0.488                                 | 1.75                             |
| Bario     | 62 | 100%                                    | 7.902    | 4.090   | 16.5         | 71.5   | 7.90                                  | 16.5                             |
| Cadmio    | 62 | 100%                                    | 0.070    | 0.050   | 0.158        | 0.24   | 0.0699                                | 0.158                            |
| Cromo     | 62 | 90%                                     | 1.295    | 0.590   | 2.41         | 19.3   | 1.30                                  | 2.41                             |
| Cobalto   | 62 | 56%                                     | 0.093    | 0.040   | 0.246        | 0.779  | 0.0927                                | 0.246                            |
| Cobre     | 62 | 100%                                    | 1.95     | 0.746   | 2.52         | 39.8   | 1.95                                  | 2.52                             |
| Hierro    | 62 | 69%                                     | 0.245    | 0.056   | 0.591        | 2.26   | 0.245                                 | 0.591                            |
| Plomo     | 62 | 100%                                    | 17.6     | 12.2    | 39.6         | 102    | 17.6                                  | 39.6                             |
| Manganeso | 62 | 100%                                    | 0.028    | 0.021   | 0.0461       | 0.137  | 0.0284                                | 0.0461                           |
| Mercurio  | 62 | 92%                                     | 0.160    | 0.077   | 0.224        | 1.84   | 0.160                                 | 0.224                            |
| Molibdeno | 62 | 81%                                     | 0.737    | 0.330   | 1.31         | 10.9   | 0.737                                 | 1.31                             |
| Níquel    | 62 | 100%                                    | 0.409    | 0.421   | 0.697        | 0.827  | 0.409                                 | 0.697                            |
| Selenio   | 62 | 100%                                    | 41.0     | 39.9    | 62.0         | 89.7   | 41.0                                  | 62.0                             |
| Estroncio | 62 | 44%                                     | 0.436    | 0.200   | 0.632        | 3.9    | 0.2                                   | 0.632                            |
| Vanadio   | 62 | 100%                                    | 23.9     | 22.0    | 34.8         | 42.8   | 23.9                                  | 34.8                             |
| Zinc      | 62 | 95%                                     | 98.7     | 10.2    | 165.4        | 1390   | 98.7                                  | 165.4                            |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos

Tabla 7      Resumen de las Estadísticas para los COPC en los Peces Marinos Utilizados para la Evaluación de Riesgos a la Salud Humana y la Ecología (Línea Base)

| Parámetro | N  | Frecuencia de<br>Detección<br>[porcentaje] | Promedio | Mediana | Percentil 90 | Máximo | Tendencia Central<br>(para modelo) | Límite Superior<br>(para modelo) |
|-----------|----|--------------------------------------------|----------|---------|--------------|--------|------------------------------------|----------------------------------|
| Aluminio  | 33 | 91%                                        | 19.3     | 10.5    | 44           | 84.6   | 19.3                               | 44                               |
| Antimonio | 33 | 0%                                         | 0.0261   | 0.02    | 0.03         | 0.2    | 0.02                               | 0.03                             |
| Arsénico  | 33 | 100%                                       | 1.98     | 1.45    | 3.304        | 8.78   | 1.98                               | 3.304                            |
| Bario     | 33 | 100%                                       | 2.25     | 2.17    | 3.398        | 11.9   | 2.25                               | 3.398                            |
| Cadmio    | 33 | 58%                                        | 0.0228   | 0.015   | 0.0372       | 0.147  | 0.0228                             | 0.0372                           |
| Cromo     | 33 | 67%                                        | 0.414    | 0.3     | 0.9          | 2      | 0.414                              | 0.9                              |
| Cobalto   | 33 | 12%                                        | 0.0536   | 0.04    | 0.06         | 0.4    | 0.04                               | 0.06                             |
| Cobre     | 33 | 100%                                       | 0.634    | 0.518   | 0.860        | 2.34   | 0.634                              | 0.860                            |
| Hierro    | 33 | 15%                                        | 0.072    | 0.04    | 0.076        | 0.429  | 0.04                               | 0.076                            |
| Plomo     | 33 | 100%                                       | 6.67     | 6.59    | 11.8         | 15.9   | 6.67                               | 11.8                             |
| Manganeso | 33 | 100%                                       | 0.0930   | 0.0854  | 0.139        | 0.37   | 0.0930                             | 0.139                            |
| Mercurio  | 33 | 64%                                        | 0.0352   | 0.03    | 0.0508       | 0.2    | 0.0352                             | 0.0508                           |
| Molibdeno | 33 | 27%                                        | 0.307    | 0.21    | 0.424        | 2      | 0.21                               | 0.424                            |
| Níquel    | 33 | 100%                                       | 0.595    | 0.538   | 0.901        | 1.24   | 0.595                              | 0.901                            |
| Selenio   | 33 | 100%                                       | 50.9     | 51.4    | 87.1         | 105    | 50.9                               | 87.1                             |
| Estroncio | 33 | 39%                                        | 0.292    | 0.23    | 0.368        | 2      | 0.23                               | 0.368                            |
| Vanadio   | 33 | 100%                                       | 26.1     | 30.4    | 37.9         | 39.9   | 26.1                               | 37.9                             |
| Zinc      | 33 | 91%                                        | 19.3     | 10.5    | 44           | 84.6   | 19.3                               | 44                               |

Notas: Concentraciones están en miligramos por kilogramo de peso seco; análisis estadísticos fueron realizados utilizando límites de detección completos



Tabla 8      Resumen de Concentraciones Pronosticadas de Línea Base – Tendencia Central (Promedios)

| COPC      | Salud Humana                                           |                                                        |                                                               |                                                        |                                      |                                            |                                                      |                                                  | Salud Ecológica                                       |                                          |                                                  |
|-----------|--------------------------------------------------------|--------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------|--------------------------------------|--------------------------------------------|------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------|------------------------------------------|--------------------------------------------------|
|           | Producto - Fruto<br>(mg/kg peso Húmedo) <sup>(a)</sup> | Producto - Arroz<br>(mg/kg peso Húmedo) <sup>(a)</sup> | Alimento - Carne de Res<br>(mg/kg peso Húmedo) <sup>(a)</sup> | Alimento - Pollo<br>(mg/kg peso Húmedo) <sup>(a)</sup> | Aire - Costa<br>(mg/m <sup>3</sup> ) | Aire - Agricultura<br>(mg/m <sup>3</sup> ) | Aire - Comunidades Indígenas<br>(mg/m <sup>3</sup> ) | Aire - Cerco Perimétrico<br>(mg/m <sup>3</sup> ) | Vegetación - Hojas (mg/kg peso Húmedo) <sup>(a)</sup> | Fruta (mg/kg peso Húmedo) <sup>(a)</sup> | Invertebrados (mg/kg peso Húmedo) <sup>(a)</sup> |
| Aluminio  | 5.24E+00                                               | 1.15E+01                                               | 3.25E-01                                                      | 7.03E-01                                               | 3.00E-05                             | 4.67E-05                                   | 4.31E-05                                             | 2.63E-05                                         | 2.23E+03                                              | 8.54E+02                                 | 6.32E+03                                         |
| Antimonio | ND                                                     | ND                                                     | ND                                                            | ND                                                     | ND                                   | ND                                         | ND                                                   | ND                                               | 1.55E-01                                              | 7.20E-02                                 | 2.40E+00                                         |
| Arsénico  | 7.68E-03                                               | 1.69E-02                                               | 2.50E-05                                                      | 8.64E-05                                               | 1.10E-06                             | 1.71E-06                                   | 1.58E-06                                             | 1.10E-06                                         | 6.20E-02                                              | 7.20E-03                                 | 4.82E-01                                         |
| Bario     | 3.80E+00                                               | 5.54E+00                                               | 2.15E-04                                                      | 3.31E-04                                               | 3.75E-06                             | 5.84E-06                                   | 5.39E-06                                             | 3.29E-06                                         | 1.78E+01                                              | 2.09E+01                                 | 2.75E+01                                         |
| Cadmio    | 1.92E-02                                               | 4.22E-02                                               | 1.93E-06                                                      | 2.19E-05                                               | 3.35E-06                             | 5.22E-06                                   | 4.82E-06                                             | 2.93E-06                                         | 2.64E-02                                              | 1.25E-02                                 | 4.46E-01                                         |
| Cromo     | 8.55E-02                                               | 8.84E+00                                               | 2.05E-03                                                      | 7.13E-03                                               | 3.00E-07                             | 4.67E-07                                   | 4.31E-07                                             | 3.00E-07                                         | 3.43E+00                                              | 1.33E+00                                 | 9.20E+00                                         |
| Cobalto   | 2.42E-02                                               | 6.37E-02                                               | 6.19E-04                                                      | 4.96E-03                                               | 1.50E-06                             | 2.34E-06                                   | 2.16E-06                                             | 1.31E-06                                         | 1.30E-01                                              | 2.91E-02                                 | 3.42E+00                                         |
| Cobre     | 2.53E+01                                               | 1.08E+01                                               | 5.57E-02                                                      | 2.81E-02                                               | 3.30E-06                             | 5.14E-06                                   | 4.75E-06                                             | 3.30E-06                                         | 6.95E+01                                              | 1.47E+01                                 | 2.51E+01                                         |
| Hierro    | 1.37E+01                                               | 3.01E+01                                               | 2.90E-02                                                      | 4.86E-02                                               | 3.85E-05                             | 6.00E-05                                   | 5.54E-05                                             | 3.38E-05                                         | ND                                                    | ND                                       | ND                                               |
| Plomo     | 9.22E-03                                               | 1.52E-01                                               | 1.68E-05                                                      | 1.15E-03                                               | 5.03E-06                             | 7.84E-06                                   | 7.24E-06                                             | 5.03E-06                                         | 1.16E-01                                              | 6.48E-02                                 | 6.08E+01                                         |
| Manganeso | 8.60E+00                                               | 1.89E+01                                               | 1.87E-01                                                      | 8.03E-02                                               | 1.00E-07                             | 1.56E-07                                   | 1.44E-07                                             | 8.76E-08                                         | ND                                                    | ND                                       | ND                                               |
| Mercurio  | 1.99E-03                                               | 7.13E-03                                               | 3.97E-04                                                      | 4.35E-03                                               | 3.50E-06                             | 5.45E-06                                   | 5.03E-06                                             | 3.07E-06                                         | ND                                                    | ND                                       | ND                                               |
| Molibdeno | 6.14E-02                                               | 1.35E-01                                               | 8.95E-05                                                      | 2.03E-04                                               | 3.50E-06                             | 7.83E-06                                   | 7.23E-06                                             | 4.40E-06                                         | 1.15E-01                                              | 1.95E-01                                 | 2.53E-01                                         |
| Níquel    | 7.68E-02                                               | 1.35E+00                                               | 2.95E-04                                                      | 1.00E-03                                               | 7.38E-06                             | 1.15E-05                                   | 1.06E-05                                             | 6.50E-06                                         | 3.10E-01                                              | 1.20E-02                                 | 1.92E+00                                         |
| Selenio   | 1.28E-02                                               | 2.81E-02                                               | 3.95E-04                                                      | 1.88E-03                                               | 3.00E-07                             | 4.67E-07                                   | 4.31E-07                                             | 3.00E-07                                         | 6.12E+01                                              | 2.23E+01                                 | 1.40E+01                                         |
| Estroncio | ND                                                     | ND                                                     | ND                                                            | ND                                                     | ND                                   | ND                                         | ND                                                   | ND                                               | 6.12E+01                                              | 2.23E+01                                 | 1.40E+01                                         |
| Vanadio   | 1.24E-01                                               | 2.73E-01                                               | 6.89E-04                                                      | 4.34E-03                                               | 9.00E-07                             | 1.40E-06                                   | 1.29E-06                                             | 9.00E-07                                         | 2.76E-01                                              | 1.17E-01                                 | 2.13E+01                                         |
| Zinc      | 5.61E+00                                               | 2.05E+01                                               | 3.06E-01                                                      | 5.66E-01                                               | 4.40E-06                             | 6.85E-06                                   | 6.33E-06                                             | 3.85E-06                                         | ND                                                    | ND                                       | ND                                               |

Notas:  
<sup>(a)</sup>. Los datos fueron convertidos a pedo húmedo utilizando el promedio de contenido de humedad para todos los datos del sitio  
ND- No disponible. Este químico no fue considerado como un COPC para este escenario

Tabla 9      Resumen de Concentraciones Pronosticadas de Línea Base – Límite Superior

| COPC      | Salud Humana                                        |                                                     |                                                            |                                                     |                      |                            |                                      |                                  | Salud Ecológica                                       |                                          |                                                  |
|-----------|-----------------------------------------------------|-----------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------|----------------------|----------------------------|--------------------------------------|----------------------------------|-------------------------------------------------------|------------------------------------------|--------------------------------------------------|
|           | Producto - Fruto (mg/kg peso Húmedo) <sup>(a)</sup> | Producto - Arroz (mg/kg peso Húmedo) <sup>(a)</sup> | Alimento - Carne de Res (mg/kg peso Húmedo) <sup>(a)</sup> | Alimento - Pollo (mg/kg peso húmedo) <sup>(a)</sup> | Aire - Costa (mg/m³) | Aire - Agricultura (mg/m³) | Aire - Comunidades Indígenas (mg/m³) | Aire - Cerco Perimétrico (mg/m³) | Vegetación - Hojas (mg/kg peso Húmedo) <sup>(a)</sup> | Fruta (mg/kg peso Húmedo) <sup>(a)</sup> | Invertebrados (mg/kg peso Húmedo) <sup>(a)</sup> |
| Aluminio  | 7.25E+00                                            | 1.59E+01                                            | 4.49E-01                                                   | 9.73E-01                                            | 3.00E-05             | 9.06E-05                   | 4.64E-05                             | 2.63E-05                         | 3.09E+03                                              | 1.18E+03                                 | 8.75E+03                                         |
| Antimonio | ND                                                  | ND                                                  | ND                                                         | ND                                                  | ND                   | ND                         | ND                                   | ND                               | 1.55E-01                                              | 7.20E-02                                 | 2.40E+00                                         |
| Arsénico  | 7.68E-03                                            | 1.69E-02                                            | 2.50E-05                                                   | 8.64E-05                                            | 1.10E-06             | 3.32E-06                   | 1.70E-06                             | 1.10E-06                         | 6.20E-02                                              | 7.20E-03                                 | 4.82E-01                                         |
| Bario     | 8.06E+00                                            | 1.18E+01                                            | 3.26E-04                                                   | 5.19E-04                                            | 3.75E-06             | 1.13E-05                   | 5.81E-06                             | 3.29E-06                         | 2.61E+01                                              | 4.44E+01                                 | 3.86E+01                                         |
| Cadmio    | 3.94E-02                                            | 8.66E-02                                            | 3.96E-06                                                   | 4.51E-05                                            | 3.35E-06             | 1.01E-05                   | 5.19E-06                             | 2.93E-06                         | 5.41E-02                                              | 2.56E-02                                 | 9.15E-01                                         |
| Cromo     | 2.86E-01                                            | 2.96E+01                                            | 6.87E-03                                                   | 1.97E-02                                            | 3.00E-07             | 9.07E-07                   | 4.65E-07                             | 3.00E-07                         | 1.15E+01                                              | 4.45E+00                                 | 1.84E+01                                         |
| Cobalto   | 4.89E-02                                            | 1.29E-01                                            | 1.25E-03                                                   | 1.00E-02                                            | 1.50E-06             | 4.53E-06                   | 2.32E-06                             | 1.31E-06                         | 2.62E-01                                              | 5.89E-02                                 | 6.91E+00                                         |
| Cobre     | 6.61E+01                                            | 2.84E+01                                            | 1.46E-01                                                   | 5.73E-02                                            | 3.30E-06             | 9.97E-06                   | 5.11E-06                             | 3.30E-06                         | 1.82E+02                                              | 3.85E+01                                 | 3.91E+01                                         |
| Hierro    | 2.90E+01                                            | 6.36E+01                                            | 6.13E-02                                                   | 1.03E-01                                            | 3.85E-05             | 1.16E-04                   | 5.97E-05                             | 3.38E-05                         | ND                                                    | ND                                       | ND                                               |
| Plomo     | 9.22E-03                                            | 1.52E-01                                            | 1.68E-05                                                   | 1.15E-03                                            | 5.03E-06             | 1.52E-05                   | 7.79E-06                             | 5.03E-06                         | 1.16E-01                                              | 6.48E-02                                 | 6.08E+01                                         |
| Manganeso | 2.55E+01                                            | 5.60E+01                                            | 5.56E-01                                                   | 2.38E-01                                            | 1.00E-07             | 3.02E-07                   | 1.55E-07                             | 8.76E-08                         | ND                                                    | ND                                       | ND                                               |
| Mercurio  | 2.94E-03                                            | 1.05E-02                                            | 5.85E-04                                                   | 6.41E-03                                            | 3.50E-06             | 1.06E-05                   | 5.42E-06                             | 3.07E-06                         | ND                                                    | ND                                       | ND                                               |
| Molibdeno | 6.35E-01                                            | 1.39E+00                                            | 9.24E-04                                                   | 2.10E-03                                            | 5.03E-06             | 1.52E-05                   | 7.78E-06                             | 4.40E-06                         | 1.19E+00                                              | 2.01E+00                                 | 2.62E+00                                         |
| Níquel    | 2.82E-01                                            | 4.93E+00                                            | 1.08E-03                                                   | 3.68E-03                                            | 7.38E-06             | 2.23E-05                   | 1.14E-05                             | 6.50E-06                         | 6.82E-01                                              | 2.64E-02                                 | 4.23E+00                                         |
| Selenio   | 2.82E-02                                            | 6.18E-02                                            | 8.68E-04                                                   | 4.14E-03                                            | 3.00E-07             | 9.07E-07                   | 4.65E-07                             | 3.00E-07                         | 1.05E+02                                              | 3.82E+01                                 | 2.39E+01                                         |
| Estroncio | ND                                                  | ND                                                  | ND                                                         | ND                                                  | ND                   | ND                         | ND                                   | ND                               | 1.05E+02                                              | 3.82E+01                                 | 2.39E+01                                         |
| Vanadio   | 2.93E-01                                            | 6.44E-01                                            | 1.63E-03                                                   | 1.02E-02                                            | 9.00E-07             | 2.72E-06                   | 1.39E-06                             | 9.00E-07                         | 6.51E-01                                              | 2.75E-01                                 | 5.03E+01                                         |
| Zinc      | 1.12E+01                                            | 4.09E+01                                            | 6.10E-01                                                   | 7.96E-01                                            | 4.40E-06             | 1.33E-05                   | 6.81E-06                             | 3.85E-06                         | ND                                                    | ND                                       | ND                                               |

Notas:

<sup>(a)</sup> Los datos fueron convertidos a pedo húmedo utilizando el promedio de contenido de humedad para todos los datos del sitio

ND- No disponible. Este químico no fue considerado como un COPC para este escenario

Tabla 10 Factores de Bioacumulación para Arroz y Fruta (Guineo y Yuca) para Uso en la Evaluación de Riesgos a la Salud Humana y a la Ecología

| COPC           | ARROZ |              |                                             |                  | FRUTA (GUINEO Y YUCA) |             |              |                                             |                  |
|----------------|-------|--------------|---------------------------------------------|------------------|-----------------------|-------------|--------------|---------------------------------------------|------------------|
|                | N     | BAF Promedio | Valores de Literatura (Br); Baes et al 1984 | BAF Seleccionado | N                     | BAF Mediana | BAF Promedio | Valores de Literatura (Br); Baes et al 1984 | BAF Seleccionado |
| Aluminio (Al)  | 0     | ND           | 0.00065                                     | 0.00065          | 0                     | ND          | ND           | 0.00065                                     | 0.00065          |
| Arsénico (As)  | 0     | ND           | 0.006                                       | 0.006            | 0                     | ND          | ND           | 0.006                                       | 0.006            |
| Bario (Ba)     | 2     | 0.147        | 0.015                                       | 0.147            | 5                     | 0.180       | 0.221        | 0.015                                       | 0.221            |
| Cadmio (Cd)    | 0     | ND           | 0.15                                        | 0.15             | 0                     | ND          | ND           | 0.15                                        | 0.15             |
| Cromo (Cr)     | 2     | 0.212        | 0.0045                                      | 0.212            | 0                     | ND          | ND           | 0.0045                                      | 0.0045           |
| Cobalto (Co)   | 1     | 0.0084       | 0.007                                       | 0.0084           | 0                     | ND          | ND           | 0.007                                       | 0.007            |
| Cobre (Cu)     | 2     | 0.080        | 0.25                                        | 0.08             | 5                     | 0.046       | 0.409        | 0.25                                        | 0.41             |
| Hierro         | 0     | ND           | 0.001                                       | 0.001            | 0                     | ND          | ND           | 0.001                                       | 0.001            |
| Plomo (Pb)     | 0     | ND           | 0.009                                       | 0.009            | 1                     | 0.0012      | 0.0012       | 0.003                                       | 0.0012           |
| Manganeso (Mn) | 0     | ND           | 0.05                                        | 0.05             | 0                     | ND          | ND           | 0.05                                        | 0.05             |
| Mercurio (Hg)  | 2     | 0.120        | 0.2                                         | 0.12             | 1                     | 0.074       | 0.074        | 0.2                                         | 0.074            |
| Molibdeno (Mo) | 0     | ND           | 0.06                                        | 0.06             | 0                     | ND          | ND           | 0.06                                        | 0.06             |
| Níquel (Ni)    | 2     | 0.479        | 0.06                                        | 0.479            | 0                     | ND          | ND           | 0.06                                        | 0.06             |
| Selenio (Se)   | 0     | ND           | 0.025                                       | 0.025            | 0                     | ND          | ND           | 0.025                                       | 0.025            |
| Vanadio (V)    | 0     | ND           | 0.003                                       | 0.003            | 0                     | ND          | ND           | 0.003                                       | 0.003            |
| Zinc (Zn)      | 2     | 0.634        | 0.9                                         | 0.634            | 5                     | 0.238       | 0.38         | 0.9                                         | 0.38             |

Notas:  
ND- not disponible; no site data available for calculation of median or mean BAF  
Factores de Bioacumulación (BAF por sus siglas en inglés) son para concentraciones de peso seco

Tabla 11 Factores de Bioacumulación para Arroz y Fruta (Guineo y Yuca) para Uso en la Evaluación de Riesgos a la Salud Humana y a la Ecología

| COPC      | Hojas |                 |                  |                     |         |                               |                                       | Invertebrados |                 |                  |                     |         |                                    |                    |                                       |
|-----------|-------|-----------------|------------------|---------------------|---------|-------------------------------|---------------------------------------|---------------|-----------------|------------------|---------------------|---------|------------------------------------|--------------------|---------------------------------------|
|           | N     | Mediana del BAF | Promedio del BAF | Regresión efectuada | Valor-P | Valor de la Literatura (RAIS) | BAF Seleccionado                      | N             | Mediana del BAF | Promedio del BAF | Regresión efectuada | Valor-P | BAF de Literatura                  | Fuente             | BAF Seleccionado (Peso Seco)          |
| Aluminio  | 10    | 0.061           | 0.23             | Yes                 | 0.932   | 0.004                         | 0.23                                  | 7             | 0.803           | 0.837            | Yes                 | 0.474   | 0.04                               | US EPA 1999        | 0.837                                 |
| Arsénico  | 0     | NA              | NA               | No                  |         | 0.05                          | 0.05                                  | 0             | -               | -                | No                  | -       | 1                                  | Eco-SSL            | 1                                     |
| Antimonio | 0     | NA              | NA               | No                  |         | 0.04                          | 0.04                                  | 1             | 0.402           | 0.402            | No                  | -       | ln(Ce)=0.706*ln(Cs)-1.421          | Eco-SSL            | 0.402                                 |
| Bario     | 17    | 0.95            | 2.52             | Yes                 | 0.024   | 0.1                           | Log(Cv) =<br>0.823 +<br>0.512*log(Cs) | 7             | 2.95            | 3.37             | Yes                 | 0.021   | 0.091                              | Eco-SSL            | log(Ce)=1.239<br>+ 0.449*<br>log(Cs)  |
| Cadmio    | 4     | 0.14            | 0.17             | No                  |         | 0.55                          | 0.17                                  | 3             | 3.70            | 3.71             | No                  | -       | ln(Ce)=0.795*ln(Cs)+2.114          | Eco-SSL            | 3.71                                  |
| Cromo     | 10    | 0.044           | 0.15             | Yes                 | 0.99    | 0.04                          | 0.15                                  | 7             | 0.753           | 1.08             | Yes                 | 0.011   | 0.306                              | Eco-SSL            | log(Ce)=0.506<br>+ 0.576 *<br>log(Cs) |
| Cobalto   | 7     | 0.011           | 0.031            | Yes                 | 0.78    | 0.054                         | 0.031                                 | 4             | 0.631           | 1.05             | No                  | -       | 0.122                              | Eco-SSL            | 1.05                                  |
| Cobre     | 17    | 0.10            | 0.93             | Yes                 | 0.94    | 0.8                           | 0.93                                  | 7             | 0.353           | 0.976            | Yes                 | 0.02    | 0.515                              | Eco-SSL            | log(Ce)=0.916<br>+ 0.463 *<br>log(Cs) |
| Hierro    | 0     | NA              | NA               | No                  |         | 0.01                          | 0.01                                  | 0             |                 |                  |                     |         | 0.04                               | US EPA 1999        | 0.04                                  |
| Plomo     | 1     | 0.013           | 0.013            | No                  |         | 0.09                          | 0.013                                 | 1             | 8.45            | 8.45             | No                  | -       | ln(Ce)=0.807*ln(Cs)-0.218          | Eco-SSL            | 8.45                                  |
| Manganeso | 10    | 0.40            | 2.3              | Yes                 | 0.34    | 0.68                          | 2.3                                   | 7             | 1.20            | 1.33             | Yes                 | 0.199   | ln(Ce)=0.682*ln(Cs)-0.809          | Eco-SSL            | 1                                     |
| Mercurio  | 17    | 0.51            | 0.58             | Yes                 | 0.06    | 1                             | 0.58                                  | 7             | 4.85            | 10.7             | Yes                 | 0.05    | ln(Ce)= -0.684 + 0.188 *<br>ln(Cs) | Sample et al. 1998 | 10.7                                  |
| Molibdeno | 4     | 0.086           | 0.093            | No                  |         | 0.4                           | 0.093                                 | 4             | 0.130           | 0.264            | No                  | -       | N/A                                |                    | 0.26                                  |
| Níquel    | 8     | 0.329           | 0.357            | Yes                 | 0.68    | 0.18                          | 0.357                                 | 2             | 0.965           | 0.965            | No                  | -       | ln(Ce)= 3.677 - 0.260 *<br>ln(Cs)  | Sample et al. 1998 | 0.97                                  |
| Selenio   | 0     | NA              | NA               | No                  |         | 0.5                           | 0.5                                   | 1             | 4.01            | 4.01             | No                  | -       | ln(Ce)=0.733*ln(Cs)-0.075          | Eco-SSL            | 4.01                                  |
| Estroncio | 10    | 12              | 32               | Yes                 | 0.69    | 1.1                           | 32                                    | 7             | 6.04            | 9.31             | Yes                 | 0.779   | N/A                                |                    | 9.31                                  |
| Vanadio   | 0     | NA              | NA               | No                  |         | 0.005                         | 0.005                                 | 7             | 0.506           | 0.549            | Yes                 | 0.111   | 0.042                              | Eco-SSL            | 0.549                                 |
| Zinc      | 17    | 0.74            | 2.2              | Yes                 | 0.73    | 0.99                          | 2.2                                   | 7             | 5.56            | 9.72             | Yes                 | 0.032   | ln(Ce)=0.328*ln(Cs)+4.449          | Eco-SSL            | log(Ce)=1.969<br>+ 0.278 *<br>log(Cs) |

Notas:

Factores de bioacumulación (BAF por sus siglas en inglés) para la evaluación de riesgos a la ecología fueron usados para la evaluación de riesgo a la salud humana (como entradas al modelo de ganado)

ND - no detectable, no hubo datos de campo para el cálculo de las medianas o promedios de los BAF

BAF son para concentraciones en peso seco

Tabla 12 Factores de Bioacumulación para Arroz y Fruta (Guineo y Yuca) para Uso en la Evaluación de Riesgos a la Salud Humana y a la Ecología

| COPC      | Fruta |                 |                  |                     |         |                                                |                  |
|-----------|-------|-----------------|------------------|---------------------|---------|------------------------------------------------|------------------|
|           | N     | Mediana del BAF | Promedio del BAF | Regresión efectuada | Valor-P | Valores de la Literatura (Br); Baes et al 1984 | BAF Seleccionado |
| Aluminio  | 9     | 0.113094373     | 0.00262357       | Yes                 | 0.162   | 0.00065                                        | 0.113            |
| Arsénico  | 0     | ND              | ND               | No                  |         | 0.03                                           | 0.03             |
| Antimonio | 0     | ND              | ND               | No                  |         | 0.006                                          | 0.006            |
| Bario     | 10    | 1.31            | 1.02             | Yes                 | 0.298   | 0.015                                          | 1.3              |
| Cadmio    | 4     | 0.097           | 0.10             | No                  |         | 0.15                                           | 0.10             |
| Cromo     | 3     | 0.075           | 0.051            | No                  |         | 0.0045                                         | 0.075            |
| Cobalto   | 2     | 0.009           | 0.009            | No                  |         | 0.007                                          | 0.009            |
| Cobre     | 10    | 0.25            | 0.089            | Yes                 | 0.38    | 0.25                                           | 0.25             |
| Plomo     | 0     | ND              | ND               | No                  |         | 0.009                                          | 0.009            |
| Manganeso | NC    | NC              | NC               | No                  |         |                                                |                  |
| Molibdeno | 3     | 0.20            | 0.15             | No                  |         | 0.06                                           | 0.20             |
| Selenio   | 0     | ND              | ND               | No                  |         | 0.025                                          | 0.025            |
| Estroncio | 10    | 15              | 11               | Yes                 | 0.21    | 0.25                                           | 15               |
| Vanadio   | 0     | ND              | ND               | No                  |         | 0.003                                          | 0.003            |

Notas:  
NC - no fue calculado, no es un COPC Ecológico y matriz no fue usada en el análisis de riesgo a la salud humana  
ND- no disponible; no hubo datos del sitio disponibles para los cálculos de las medianas o promedios del BAF  
BAF son para concentraciones en peso seco

Tabla 13    Concentraciones de Exposición para Impactos en la Salud Humana – Tendencia Central

| Parámetro | Agua - Comunidades Agrícolas (mg/L) | Agua - Comunidades Indígenas (mg/L) | Peces - Comunidades Agrícolas (mg/kg peso húmedo) | Peces - Comunidades Indígenas (mg/kg peso húmedo) | Suelo de la Costa (mg/kg) | Suelo Agrícola (mg/kg) | Suelo en Comunidades Indígenas (mg/kg) | Suelo en el Cerco Permétrico (mg/kg) | Produce - Fruit - Agricul. (mg/kg - peso húmedo) | Producto - Fruta - Comunidades Indígenas (mg/kg peso húmedo) |
|-----------|-------------------------------------|-------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------|------------------------|----------------------------------------|--------------------------------------|--------------------------------------------------|--------------------------------------------------------------|
| Aluminio  | 3.50E-01                            | 1.80E-01                            | 9.87E+01                                          | 9.87E+01                                          | 3.15E+04                  | 3.15E+04               | 3.15E+04                               | 3.21E+04                             | 5.92E+00                                         | 5.26E+00                                                     |
| Arsénico  | 1.20E-03                            | 8.40E-04                            | 2.93E+00                                          | 1.72E+00                                          | 5.16E+00                  | 5.04E+00               | 5.07E+00                               | 1.83E+01                             | 8.25E-03                                         | 8.65E-03                                                     |
| Bario     | 2.50E-02                            | 2.20E-02                            | 1.58E+01                                          | 1.42E+01                                          | 6.71E+01                  | 6.73E+01               | 6.71E+01                               | 6.90E+01                             | 3.81E+00                                         | 3.80E+00                                                     |
| Cadmio    | 5.50E-05                            | 7.80E-05                            | 6.99E-02                                          | 7.34E-02                                          | 6.34E-01                  | 6.69E-01               | 5.26E-01                               | 4.02E+00                             | 2.82E-02                                         | 2.06E-02                                                     |
| Cromo     | 4.00E-04                            | 2.40E-04                            | 1.30E+00                                          | 1.30E+00                                          | 7.50E+01                  | 7.45E+01               | 7.44E+01                               | 1.01E+02                             | 9.03E-02                                         | 8.76E-02                                                     |
| Cobalto   | 4.00E-04                            | 4.00E-04                            | 1.08E-01                                          | 1.24E-01                                          | 1.35E+01                  | 1.36E+01               | 1.35E+01                               | 1.66E+01                             | 2.52E-02                                         | 2.44E-02                                                     |
| Cobre     | 5.00E-03                            | 5.80E-03                            | 1.95E+00                                          | 2.14E+00                                          | 1.04E+03                  | 2.73E+02               | 3.00E+02                               | 1.09E+04                             | 2.90E+01                                         | 3.23E+01                                                     |
| Hierro    | 3.50E-01                            | 3.20E-01                            | ND                                                | ND                                                | 5.36E+04                  | 5.37E+04               | 5.36E+04                               | 5.48E+04                             | 1.51E+01                                         | 1.38E+01                                                     |
| Plomo     | 3.00E-04                            | 2.80E-04                            | 2.20E-01                                          | 2.20E-01                                          | 3.06E+01                  | 3.01E+01               | 3.01E+01                               | 5.60E+01                             | 1.07E-02                                         | 1.11E-02                                                     |
| Manganeso | 3.25E-02                            | 2.40E-02                            | 2.42E+01                                          | 2.33E+01                                          | 6.72E+02                  | 6.73E+02               | 6.72E+02                               | 6.92E+02                             | 8.64E+00                                         | 8.60E+00                                                     |
| Mercurio  | 2.00E-05                            | 2.00E-05                            | 2.84E-02                                          | 2.84E-02                                          | 1.36E-01                  | 1.62E-01               | 1.19E-01                               | 2.68E+00                             | 3.82E-03                                         | 2.42E-03                                                     |
| Molibdeno | 5.25E-03                            | 4.58E-03                            | 1.66E+00                                          | 3.58E+00                                          | 4.00E+00                  | 4.05E+00               | 4.00E+00                               | 4.66E+00                             | 6.29E-02                                         | 6.15E-02                                                     |
| Níquel    | 3.50E-04                            | 2.20E-04                            | 7.37E-01                                          | 8.11E-01                                          | 5.09E+00                  | 5.09E+00               | 5.04E+00                               | 1.35E+01                             | 7.94E-02                                         | 7.80E-02                                                     |
| Selenio   | 5.00E-04                            | 5.20E-04                            | 4.60E-01                                          | 4.91E-01                                          | 2.44E+00                  | 2.09E+00               | 2.20E+00                               | 4.18E+01                             | 1.46E-02                                         | 1.66E-02                                                     |
| Vanadio   | 1.00E-03                            | 8.60E-04                            | 2.00E-01                                          | 2.00E-01                                          | 1.64E+02                  | 1.62E+02               | 1.62E+02                               | 2.38E+02                             | 1.30E-01                                         | 1.30E-01                                                     |
| Zinc      | 3.25E-03                            | 3.20E-03                            | 3.28E+01                                          | 2.86E+01                                          | 5.76E+01                  | 5.79E+01               | 5.75E+01                               | 6.18E+01                             | 5.65E+00                                         | 5.61E+00                                                     |

| Parámetro | Producto - Arroz - Comunidades Agrícolas (mg/kg peso húmedo) | Producto - Arroz - Comunidades Indígenas (mg/kg peso húmedo) | Alimento - Carne de Res - Comunidades Agrícolas (mg/kg peso húmedo) | Alimento - Carne de Res - Comunidades Indígenas (mg/kg peso húmedo) | Alimento - Pollo - Comunidades Agrícolas (mg/kg peso húmedo) | Alimento - Pollo - Comunidades Indígenas (mg/kg peso húmedo) | Aire - Río Caimito (mg/m³) | Aire - Comunidades Agrícolas (mg/m³) | Aire - Comunidades Indígenas (mg/m³) | Aire - Cerco Perimétrico (mg/m³) |
|-----------|--------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|----------------------------|--------------------------------------|--------------------------------------|----------------------------------|
| Aluminio  | 1.30E+01                                                     | 1.15E+01                                                     | 3.25E-01                                                            | 3.25E-01                                                            | 7.05E-01                                                     | 7.03E-01                                                     | 3.07E-05                   | 1.13E-04                             | 4.63E-05                             | 1.10E-03                         |
| Arsénico  | 1.81E-02                                                     | 1.90E-02                                                     | 2.53E-05                                                            | 2.55E-05                                                            | 8.89E-05                                                     | 8.78E-05                                                     | 1.18E-06                   | 1.73E-06                             | 1.60E-06                             | 2.19E-06                         |
| Bario     | 5.56E+00                                                     | 5.55E+00                                                     | 2.15E-04                                                            | 2.15E-04                                                            | 3.72E-04                                                     | 3.31E-04                                                     | 3.75E-06                   | 6.05E-06                             | 5.40E-06                             | 6.73E-06                         |
| Cadmio    | 6.20E-02                                                     | 4.52E-02                                                     | 2.74E-06                                                            | 2.06E-06                                                            | 3.17E-05                                                     | 2.31E-05                                                     | 3.47E-06                   | 5.42E-06                             | 4.84E-06                             | 5.55E-05                         |
| Cromo     | 8.89E+00                                                     | 8.86E+00                                                     | 2.06E-03                                                            | 2.06E-03                                                            | 9.51E-03                                                     | 7.15E-03                                                     | 1.51E-06                   | 8.47E-07                             | 5.51E-07                             | 1.66E-05                         |
| Cobalto   | 6.60E-02                                                     | 6.43E-02                                                     | 6.23E-04                                                            | 6.20E-04                                                            | 5.05E-03                                                     | 4.97E-03                                                     | 1.51E-06                   | 2.42E-06                             | 2.16E-06                             | 2.50E-06                         |
| Cobre     | 1.33E+01                                                     | 1.54E+01                                                     | 6.34E-02                                                            | 7.00E-02                                                            | 3.77E-02                                                     | 3.40E-02                                                     | 7.31E-04                   | 4.69E-05                             | 6.98E-05                             | 6.66E-03                         |
| Hierro    | 3.32E+01                                                     | 3.02E+01                                                     | 2.91E-02                                                            | 2.90E-02                                                            | 4.93E-02                                                     | 4.87E-02                                                     | 4.01E-05                   | 1.97E-04                             | 6.20E-05                             | 2.27E-03                         |
| Plomo     | 1.55E-01                                                     | 1.56E-01                                                     | 1.69E-05                                                            | 1.69E-05                                                            | 1.16E-03                                                     | 1.16E-03                                                     | 5.90E-06                   | 7.94E-06                             | 7.32E-06                             | 1.66E-05                         |
| Manganeso | 1.90E+01                                                     | 1.89E+01                                                     | 1.88E-01                                                            | 1.87E-01                                                            | 8.51E-02                                                     | 8.03E-02                                                     | 1.65E-07                   | 2.51E-06                             | 2.71E-07                             | 3.83E-05                         |
| Mercurio  | 1.26E-02                                                     | 8.41E-03                                                     | 6.25E-04                                                            | 4.51E-04                                                            | 6.84E-03                                                     | 4.90E-03                                                     | 3.51E-06                   | 5.47E-06                             | 5.04E-06                             | 3.62E-06                         |
| Molibdeno | 1.38E-01                                                     | 1.35E-01                                                     | 9.10E-05                                                            | 9.04E-05                                                            | 2.46E-04                                                     | 2.05E-04                                                     | 5.03E-06                   | 7.90E-06                             | 7.23E-06                             | 5.62E-06                         |
| Níquel    | 1.37E+00                                                     | 1.36E+00                                                     | 3.01E-04                                                            | 2.98E-04                                                            | 1.42E-03                                                     | 1.01E-03                                                     | 7.40E-06                   | 1.15E-05                             | 1.06E-05                             | 7.09E-06                         |
| Selenio   | 3.20E-02                                                     | 3.65E-02                                                     | 4.14E-04                                                            | 4.37E-04                                                            | 1.99E-03                                                     | 2.07E-03                                                     | 4.15E-07                   | 5.01E-07                             | 4.67E-07                             | 2.79E-06                         |
| Vanadio   | 2.86E-01                                                     | 2.86E-01                                                     | 6.92E-04                                                            | 6.92E-04                                                            | 4.38E-03                                                     | 4.35E-03                                                     | 4.31E-06                   | 1.85E-06                             | 1.60E-06                             | 4.72E-05                         |
| Zinc      | 2.06E+01                                                     | 2.05E+01                                                     | 3.08E-01                                                            | 3.06E-01                                                            | 6.67E-01                                                     | 5.66E-01                                                     | 4.43E-06                   | 7.39E-06                             | 6.36E-06                             | 1.20E-05                         |

Table 14    Concentraciones de Exposición para Impactos en la Salud Humana – Límite Superior

| Parámetro | Agua - Comunidades Agrícolas (mg/L) | Agua - Comunidades Indígenas (mg/L) | Peces - Comunidades Agrícolas (mg/kg peso húmedo) | Peces - Comunidades Indígenas (mg/kg peso húmedo) | Suelo de la Costa (mg/kg) | Suelo Agrícola (mg/kg) | Suelo en Comunidades Indígenas (mg/kg) | Suelo en el Cerco Permétrico (mg/kg) | Produce - Fruit - Agricul. (mg/kg - peso húmedo) | Producto - Fruta - Comunidades Indígenas (mg/kg peso húmedo) |
|-----------|-------------------------------------|-------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------|------------------------|----------------------------------------|--------------------------------------|--------------------------------------------------|--------------------------------------------------------------|
| Aluminio  | 4.00E-01                            | 2.00E-01                            | 1.65E+02                                          | 1.65E+02                                          | 4.36E+04                  | 4.36E+04               | 4.36E+04                               | 4.41E+04                             | 8.46E+00                                         | 7.28E+00                                                     |
| Arsénico  | 2.00E-03                            | 1.00E-03                            | 1.75E+01                                          | 8.75E+00                                          | 5.16E+00                  | 5.06E+00               | 5.10E+00                               | 1.83E+01                             | 8.65E-03                                         | 9.18E-03                                                     |
| Bario     | 3.00E-02                            | 3.00E-02                            | 4.94E+01                                          | 3.29E+01                                          | 1.42E+02                  | 1.43E+02               | 1.42E+02                               | 1.44E+02                             | 8.07E+00                                         | 8.06E+00                                                     |
| Cadmio    | 7.00E-05                            | 9.00E-05                            | 1.58E-01                                          | 1.97E-01                                          | 1.16E+00                  | 1.28E+00               | 1.07E+00                               | 4.54E+00                             | 5.34E-02                                         | 4.16E-02                                                     |
| Cromo     | 4.00E-04                            | 3.00E-04                            | 2.41E+00                                          | 2.41E+00                                          | 2.49E+02                  | 2.49E+02               | 2.49E+02                               | 2.75E+02                             | 2.95E-01                                         | 2.90E-01                                                     |
| Cobalto   | 4.00E-04                            | 4.00E-04                            | 3.28E-01                                          | 4.92E-01                                          | 2.73E+01                  | 2.74E+01               | 2.73E+01                               | 3.04E+01                             | 5.05E-02                                         | 4.93E-02                                                     |
| Cobre     | 8.00E-03                            | 9.00E-03                            | 2.52E+00                                          | 3.78E+00                                          | 1.43E+03                  | 6.78E+02               | 7.30E+02                               | 1.13E+04                             | 7.17E+01                                         | 7.79E+01                                                     |
| Hierro    | 4.00E-01                            | 4.00E-01                            | ND                                                | ND                                                | 1.13E+05                  | 1.13E+05               | 1.13E+05                               | 1.14E+05                             | 3.15E+01                                         | 2.90E+01                                                     |
| Plomo     | 4.00E-04                            | 3.00E-04                            | 5.91E-01                                          | 5.91E-01                                          | 3.06E+01                  | 3.01E+01               | 3.02E+01                               | 5.60E+01                             | 1.15E-02                                         | 1.22E-02                                                     |
| Manganeso | 4.00E-02                            | 3.00E-02                            | 7.93E+01                                          | 5.95E+01                                          | 1.99E+03                  | 2.00E+03               | 1.99E+03                               | 2.01E+03                             | 2.56E+01                                         | 2.55E+01                                                     |
| Mercurio  | 2.00E-05                            | 2.00E-05                            | 4.61E-02                                          | 4.61E-02                                          | 1.86E-01                  | 3.07E-01               | 1.76E-01                               | 2.73E+00                             | 7.82E-03                                         | 3.60E-03                                                     |
| Molibdeno | 1.00E-02                            | 6.00E-03                            | 3.74E+00                                          | 6.73E+00                                          | 4.13E+01                  | 4.14E+01               | 4.13E+01                               | 4.20E+01                             | 6.37E-01                                         | 6.35E-01                                                     |
| Níquel    | 4.00E-04                            | 3.00E-04                            | 1.31E+00                                          | 1.97E+00                                          | 1.84E+01                  | 1.85E+01               | 1.84E+01                               | 2.69E+01                             | 2.87E-01                                         | 2.83E-01                                                     |
| Selenio   | 5.00E-04                            | 8.00E-04                            | 8.71E-01                                          | 1.04E+00                                          | 4.84E+00                  | 4.53E+00               | 4.70E+00                               | 4.42E+01                             | 3.07E-02                                         | 3.40E-02                                                     |
| Vanadio   | 1.00E-03                            | 9.00E-04                            | 6.32E-01                                          | 6.32E-01                                          | 3.84E+02                  | 3.83E+02               | 3.83E+02                               | 4.58E+02                             | 3.03E-01                                         | 3.03E-01                                                     |
| Zinc      | 4.00E-03                            | 4.00E-03                            | 6.96E+01                                          | 6.96E+01                                          | 1.15E+02                  | 1.15E+02               | 1.15E+02                               | 1.19E+02                             | 1.13E+01                                         | 1.12E+01                                                     |

| Parámetro | Producto - Arroz - Comunidades Agrícolas (mg/kg peso húmedo) | Producto - Arroz - Comunidades Indígenas (mg/kg peso húmedo) | Alimento - Carne de Res - Comunidades Agrícolas (mg/kg peso húmedo) | Alimento - Carne de Res - Comunidades Indígenas (mg/kg peso húmedo) | Alimento - Pollo - Comunidades Agrícolas (mg/kg peso húmedo) | Alimento - Pollo - Comunidades Indígenas (mg/kg peso húmedo) | Aire - Río Caimito (mg/m³) | Aire - Comunidades Agrícolas (mg/m³) | Aire - Comunidades Indígenas (mg/m³) | Aire - Cerco Perimétrico (mg/m³) |
|-----------|--------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|----------------------------|--------------------------------------|--------------------------------------|----------------------------------|
| Aluminio  | 1.86E+01                                                     | 1.60E+01                                                     | 4.50E-01                                                            | 4.49E-01                                                            | 9.75E-01                                                     | 9.73E-01                                                     | 3.07E-05                   | 1.78E-04                             | 5.15E-05                             | 1.10E-03                         |
| Arsénico  | 1.90E-02                                                     | 2.02E-02                                                     | 2.55E-05                                                            | 2.58E-05                                                            | 8.77E-05                                                     | 8.86E-05                                                     | 1.18E-06                   | 3.33E-06                             | 1.73E-06                             | 2.19E-06                         |
| Bario     | 1.18E+01                                                     | 1.18E+01                                                     | 3.27E-04                                                            | 3.26E-04                                                            | 5.20E-04                                                     | 5.19E-04                                                     | 3.75E-06                   | 1.14E-05                             | 5.82E-06                             | 6.73E-06                         |
| Cadmio    | 1.17E-01                                                     | 9.14E-02                                                     | 5.22E-06                                                            | 4.16E-06                                                            | 5.68E-05                                                     | 4.69E-05                                                     | 3.47E-06                   | 1.02E-05                             | 5.23E-06                             | 5.55E-05                         |
| Cromo     | 2.97E+01                                                     | 2.96E+01                                                     | 6.89E-03                                                            | 6.88E-03                                                            | 1.97E-02                                                     | 1.97E-02                                                     | 1.51E-06                   | 1.08E-06                             | 6.73E-07                             | 1.66E-05                         |
| Cobalto   | 1.33E-01                                                     | 1.30E-01                                                     | 1.26E-03                                                            | 1.25E-03                                                            | 1.01E-02                                                     | 1.01E-02                                                     | 1.51E-06                   | 4.56E-06                             | 2.33E-06                             | 2.50E-06                         |
| Cobre     | 3.20E+01                                                     | 3.61E+01                                                     | 1.57E-01                                                            | 1.70E-01                                                            | 6.15E-02                                                     | 6.62E-02                                                     | 7.31E-04                   | 6.54E-05                             | 1.19E-04                             | 6.66E-03                         |
| Hierro    | 6.92E+01                                                     | 6.38E+01                                                     | 6.15E-02                                                            | 6.13E-02                                                            | 1.03E-01                                                     | 1.03E-01                                                     | 4.01E-05                   | 3.48E-04                             | 7.03E-05                             | 2.27E-03                         |
| Plomo     | 1.57E-01                                                     | 1.59E-01                                                     | 1.69E-05                                                            | 1.70E-05                                                            | 1.16E-03                                                     | 1.16E-03                                                     | 5.90E-06                   | 1.53E-05                             | 7.94E-06                             | 1.66E-05                         |
| Manganeso | 5.62E+01                                                     | 5.60E+01                                                     | 5.57E-01                                                            | 5.56E-01                                                            | 2.39E-01                                                     | 2.38E-01                                                     | 1.65E-07                   | 5.49E-06                             | 3.57E-07                             | 3.83E-05                         |
| Mercurio  | 2.51E-02                                                     | 1.25E-02                                                     | 1.20E-03                                                            | 6.68E-04                                                            | 1.27E-02                                                     | 7.26E-03                                                     | 3.51E-06                   | 1.06E-05                             | 5.43E-06                             | 3.62E-06                         |
| Molibdeno | 1.40E+00                                                     | 1.39E+00                                                     | 9.27E-04                                                            | 9.25E-04                                                            | 2.10E-03                                                     | 2.10E-03                                                     | 5.03E-06                   | 1.52E-05                             | 7.79E-06                             | 5.62E-06                         |
| Níquel    | 4.99E+00                                                     | 4.95E+00                                                     | 1.10E-03                                                            | 1.09E-03                                                            | 3.72E-03                                                     | 3.69E-03                                                     | 7.40E-06                   | 2.23E-05                             | 1.14E-05                             | 7.09E-06                         |
| Selenio   | 6.74E-02                                                     | 7.47E-02                                                     | 8.96E-04                                                            | 9.33E-04                                                            | 4.27E-03                                                     | 4.43E-03                                                     | 4.15E-07                   | 9.25E-07                             | 5.20E-07                             | 2.79E-06                         |
| Vanadio   | 6.65E-01                                                     | 6.65E-01                                                     | 1.63E-03                                                            | 1.63E-03                                                            | 1.02E-02                                                     | 1.02E-02                                                     | 4.31E-06                   | 2.98E-06                             | 1.93E-06                             | 4.72E-05                         |
| Zinc      | 4.11E+01                                                     | 4.09E+01                                                     | 6.13E-01                                                            | 6.11E-01                                                            | 7.99E-01                                                     | 7.96E-01                                                     | 4.43E-06                   | 1.35E-05                             | 6.87E-03                             | 1.20E-05                         |

Tabla 15    Concentraciones de Exposición para la Evaluación de Riesgos a la Ecología - Tendencia Central

| COPC      | Suelo           | Agua     | Peces (Agua Dulce)               | Vegetación                       | Fruta                            | Invertebrados                    |
|-----------|-----------------|----------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|           | mg/kg peso seco | mg/L     | mg/kg peso Húmedo <sup>(a)</sup> | mg/kg peso Húmedo <sup>(a)</sup> | mg/kg peso Húmedo <sup>(a)</sup> | mg/kg peso Húmedo <sup>(a)</sup> |
| Aluminio  | 3.15E+04        | 2.93E-01 | 1.09E+02                         | 2.24E+03                         | 8.56E+02                         | 6.33E+03                         |
| Antimonio | 1.00E+01        | 2.00E-04 | 1.00E-02                         | 1.56E-01                         | 7.29E-02                         | 2.41E+00                         |
| Arsénico  | 6.09E+00        | 1.36E-03 | 2.64E+00                         | 9.26E-02                         | 2.20E-02                         | 5.88E-01                         |
| Bario     | 6.73E+01        | 2.67E-02 | 1.29E+01                         | 1.78E+01                         | 2.10E+01                         | 2.75E+01                         |
| Cadmio    | 8.38E-01        | 9.53E-05 | 1.39E-01                         | 5.03E-02                         | 2.57E-02                         | 7.46E-01                         |
| Cromo     | 7.65E+01        | 4.07E-04 | 1.63E+00                         | 3.57E+00                         | 1.40E+00                         | 9.35E+00                         |
| Cobalto   | 1.38E+01        | 1.49E-03 | 4.16E-01                         | 1.37E-01                         | 3.34E-02                         | 3.48E+00                         |
| Cobre     | 1.17E+03        | 6.27E-03 | 3.18E+00                         | 3.54E+02                         | 8.39E+01                         | 3.84E+01                         |
| Plomo     | 3.22E+01        | 3.40E-04 | 2.79E-01                         | 1.60E-01                         | 9.72E-02                         | 6.52E+01                         |
| Molibdeno | 4.06E+00        | 7.43E-03 | 2.93E+00                         | 1.18E-01                         | 1.99E-01                         | 2.57E-01                         |
| Selenio   | 5.25E+00        | 5.60E-04 | 7.02E-01                         | 8.66E-01                         | 7.12E-02                         | 5.06E+00                         |
| Estroncio | 6.49E+00        | 3.52E-02 | 4.10E+01                         | 6.36E+01                         | 2.32E+01                         | 1.45E+01                         |
| Vanadio   | 1.68E+02        | 9.87E-04 | 1.93E-01                         | 3.94E-01                         | 2.04E-01                         | 2.22E+01                         |

Nota:  
<sup>(a)</sup> Datos convertidos a peso húmedo utilizando las concentraciones de humedad promedio de los datos del sitio



Tabla 16    Concentraciones de Exposición para la Evaluación de Riesgos a la Ecología - Límite Superior

| COPC      | Suelo<br>mg/kg peso seco | Agua<br>mg/L | Peces (Agua Dulce)<br>mg/kg peso Húmedo <sup>(a)</sup> | Vegetación<br>mg/kg peso Húmedo <sup>(a)</sup> | Fruta<br>mg/kg peso Húmedo <sup>(a)</sup> | Invertebrados<br>mg/kg peso Húmedo <sup>(a)</sup> |
|-----------|--------------------------|--------------|--------------------------------------------------------|------------------------------------------------|-------------------------------------------|---------------------------------------------------|
| Aluminio  | 4.36E+04                 | 4.60E-01     | 2.48E+02                                               | 3.10E+03                                       | 1.18E+03                                  | 8.76E+03                                          |
| Antimonio | 1.00E+01                 | 2.00E-04     | 2.00E-02                                               | 1.55E-01                                       | 7.22E-02                                  | 2.40E+00                                          |
| Arsénico  | 5.24E+00                 | 3.00E-03     | 1.75E+01                                               | 6.89E-02                                       | 1.06E-02                                  | 5.06E-01                                          |
| Bario     | 1.43E+02                 | 4.00E-02     | 4.28E+01                                               | 2.61E+01                                       | 4.45E+01                                  | 3.86E+01                                          |
| Cadmio    | 1.27E+00                 | 2.00E-04     | 7.88E-01                                               | 7.18E-02                                       | 3.54E-02                                  | 1.14E+00                                          |
| Cromo     | 2.49E+02                 | 6.60E-04     | 5.30E+00                                               | 1.15E+01                                       | 4.47E+00                                  | 1.85E+01                                          |
| Cobalto   | 2.74E+01                 | 4.60E-03     | 3.77E+00                                               | 2.65E-01                                       | 6.04E-02                                  | 6.93E+00                                          |
| Cobre     | 1.31E+03                 | 1.00E-02     | 8.41E+00                                               | 3.89E+02                                       | 8.91E+01                                  | 5.46E+01                                          |
| Plomo     | 3.06E+01                 | 5.00E-04     | 9.85E-01                                               | 1.29E-01                                       | 7.43E-02                                  | 6.20E+01                                          |
| Molibdeno | 4.14E+01                 | 2.00E-02     | 6.28E+00                                               | 1.19E+00                                       | 2.02E+00                                  | 2.62E+00                                          |
| Selenio   | 5.13E+00                 | 8.00E-04     | 2.65E+00                                               | 8.06E-01                                       | 3.97E-02                                  | 4.93E+00                                          |
| Estroncio | 1.10E+01                 | 4.41E-02     | 6.20E+01                                               | 1.07E+02                                       | 3.92E+01                                  | 2.45E+01                                          |
| Vanadio   | 3.84E+02                 | 1.00E-03     | 6.32E-01                                               | 6.91E-01                                       | 3.05E-01                                  | 5.06E+01                                          |

Nota:  
<sup>(a)</sup>    Datos convertidos a peso húmedo utilizando las concentraciones de humedad promedio de los datos del sitio

**ANEXO XIX**  
**APÉNDICE D**  
**Tablas de Análisis**

**Enviado a:**  
**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

Tabla 1 Tabla de Análisis de Suelos de Línea Base para la Evaluación de Riesgos a la Salud Humana y la Ecología

| Ubicación de la Muestra        | Lineamientos a la Salud Humana del CCME <sup>(a)</sup> | Notas | Lineamientos para la Salud Humana del CCME <sup>(a)</sup> | Notas          | Lineamientos Ambientales del CCME <sup>(a)</sup> | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup> | Notas | Estándares de Suelos de Panamá Uso Urbano | Estándares de Suelos de Panamá Otros Usos | Molejones   | Coclesito   | Coclesito   | Molejones   | Río Caimito | Molejones   | Río Caimito |
|--------------------------------|--------------------------------------------------------|-------|-----------------------------------------------------------|----------------|--------------------------------------------------|-------|--------------------------------------------------|-------|-------------------------------------------|-------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Vegetación <sup>(c)</sup>      |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           | Arroz       | Arroz       | Guineo      | Guineo      | Guineo      | Yuca        | Yuca        |
| Fecha de Muestreo              |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           | 25-Ago-08   | 27-Ago-08   | 27-Ago-08   | 28-Ago-08   | 29-Ago-08   | 26-Ago-08   | 29-Ago-08   |
| Identificación del Laboratorio |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           | L685670-9   | L685670-10  | L685670-13  | L685670-14  | L685670-15  | L685670-18  | L685670-20  |
| Matriz                         | Tierras Agrícolas                                      |       | Terrenos Residenciales                                    |                | Tierras Agrícolas                                |       | Terrenos Residenciales                           |       |                                           |                                           | Suelo       | Suelo       | Suelo       | Suelo       | Suelo       | Suelo       | Suelo       |
| <b>Parámetros Físicos</b>      |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           |             |             |             |             |             |             |             |
| pH                             |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           | 5.14        | 5.64        | 5.88        | 5.32        | 5.74        | 4.87        | 5.65        |
| <b>Metales</b>                 |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           |             |             |             |             |             |             |             |
| aluminio                       |                                                        |       |                                                           |                |                                                  |       |                                                  |       |                                           |                                           | -           | -           | -           | -           | -           | -           | -           |
| antimonio                      | <u>20</u>                                              | n     | <b>20</b>                                                 | n              | <u>20</u>                                        | n     | <b>20</b>                                        | n     |                                           |                                           | <10         | <10         | <10         | <10         | <10         | <10         | <10         |
| arsénico                       | <u>12</u>                                              | i     | <b>12</b>                                                 | i              | <u>17</u>                                        | c     | <b>17</b>                                        | c     | <u>20</u>                                 | <b>4</b>                                  | <5.0        | <5.0        | <b>5.3</b>  | <5.0        | <5.0        | <5.0        | <5.0        |
| bario                          | <u>750</u>                                             | n     | <b>500</b>                                                | n              | <u>750</u>                                       | n     | <b>500</b>                                       | n     | <u>100</u>                                | <b>10</b>                                 | <b>89</b>   | <b>139</b>  | <b>251</b>  | <b>143</b>  | 5.4         | <b>56.8</b> | 5.8         |
| berilio                        | <u>4</u>                                               | n     | <b>4</b>                                                  | n              | <u>4</u>                                         | n     | <b>4</b>                                         | n     | -                                         |                                           | 0.9         | 0.99        | 1.29        | 1.17        | <0.50       | 1.33        | <0.50       |
| bismuto                        | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| boro                           | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| cadmio                         | <u>1.4</u>                                             | i     | <b>14</b>                                                 | i              | <u>3.8</u>                                       | i     | <b>10</b>                                        | c     | <u>5</u>                                  | <b>0.5</b>                                | <0.50       | <0.50       | <0.50       | <0.50       | <0.50       | <0.50       | <0.50       |
| calcio                         | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| cromo                          | <u>220</u>                                             | i     | <b>220</b>                                                | i              | <u>64</u>                                        | c     | <b>64</b>                                        | c     | <u>100</u>                                | <b>10</b>                                 | <b>32.9</b> | <b>27.5</b> | <b>35.1</b> | <b>16.7</b> | 5.1         | 7.2         | <2.0        |
| cobalto                        | <u>40</u>                                              | n     | <b>50</b>                                                 | n              | <u>40</u>                                        | n     | <b>50</b>                                        | n     | -                                         |                                           | 20.5        | 17.1        | 28.1        | 20.6        | <2.0        | 25.4        | <2.0        |
| cobre                          | <u>1,100</u>                                           | i     | <b>1,100</b>                                              | i              | <u>63</u>                                        | c     | <b>63</b>                                        | c     | -                                         |                                           | <b>114</b>  | 52.3        | <b>69.9</b> | <b>80.1</b> | 5.9         | <b>74.6</b> | 2.6         |
| hierro                         | -                                                      |       | <b>11,000</b>                                             | <sup>(b)</sup> |                                                  |       |                                                  |       | -                                         |                                           |             |             |             |             |             |             |             |
| plomo                          | <u>140</u>                                             | i     | <b>140</b>                                                | i              | <u>70</u>                                        | i     | <b>300</b>                                       | c     | -                                         |                                           | <30         | <30         | <30         | <30         | <b>111</b>  | <30         | <30         |
| litio                          | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| magnesio                       | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| manganeso                      | -                                                      |       | <b>360</b>                                                | <sup>(b)</sup> |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| mercurio                       | <u>6.6</u>                                             | i     | <b>6.6</b>                                                | i              | <u>12</u>                                        | c     | <b>12</b>                                        | c     | <u>14</u>                                 | <b>1.4</b>                                | 0.093       | 0.0456      | 0.0773      | 0.0729      | 0.0658      | 0.151       | 0.0431      |
| molibdeno                      | <u>5</u>                                               | n     | <b>10</b>                                                 | n              | <u>5</u>                                         | n     | <b>10</b>                                        | n     | -                                         |                                           | <4.0        | <4.0        | <4.0        | <4.0        | <4.0        | <4.0        | <4.0        |
| níquel                         | -                                                      |       | <b>320</b>                                                | <sup>(b)</sup> | <u>50</u>                                        | c     | <b>50</b>                                        | c     | <u>40</u>                                 | <b>4</b>                                  | <b>6.3</b>  | <b>9</b>    | <b>14.2</b> | <5.0        | <5.0        | <5.0        | <5.0        |
| fósforo                        | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           |             |             |             |             |             |             |             |
| potasio                        | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           |             |             |             |             |             |             |             |
| selenio                        | <u>80</u>                                              | d     | <b>80</b>                                                 | d              | <u>1</u>                                         | c     | <b>1</b>                                         | c     | <u>63</u>                                 | <b>0.7</b>                                | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        |
| plata                          | <u>20</u>                                              | n     | <b>20</b>                                                 | n              | <u>20</u>                                        | n     | <b>20</b>                                        | n     | -                                         |                                           | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        | <2.0        |
| sodio                          | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           |             |             |             |             |             |             |             |
| estroncio                      | -                                                      |       | <b>9,400</b>                                              | <sup>(b)</sup> |                                                  |       |                                                  |       | -                                         |                                           | -           | -           | -           | -           | -           | -           | -           |
| talio                          | <u>1</u>                                               | p     | <b>1</b>                                                  | p              | <u>1</u>                                         | i     | <b>1.4</b>                                       | c     | -                                         |                                           | <1.0        | <1.0        | <1.0        | <1.0        | <1.0        | <1.0        | <1.0        |
| estaño                         | <u>5</u>                                               | n     | <b>50</b>                                                 | n              | <u>5</u>                                         | n     | <b>50</b>                                        | n     | -                                         |                                           | <5.0        | <5.0        | <5.0        | <5.0        | <5.0        | <5.0        | <5.0        |
| titanio                        | -                                                      |       |                                                           |                |                                                  |       |                                                  |       | -                                         |                                           |             |             |             |             |             |             |             |
| vanadio                        |                                                        |       | <b>110</b>                                                | <sup>(b)</sup> | <u>130</u>                                       | c     | <b>130</b>                                       | c     | -                                         |                                           | <b>147</b>  | <b>148</b>  | <b>171</b>  | <b>163</b>  | 32.2        | <b>255</b>  | 12.1        |
| zinc                           |                                                        |       | <b>4,600</b>                                              | <sup>(b)</sup> | <u>200</u>                                       | c     | <b>200</b>                                       | c     | <u>30</u>                                 | <b>3</b>                                  | <b>86.5</b> | <b>72.3</b> | <b>163</b>  | <b>100</b>  | <b>14.2</b> | <b>32.8</b> | <b>121</b>  |

| Ubicación de la Muestra        | 0536226-0982152  | 0538340-0981770                               | 0536584-0976500               | 0539137-0978302                            | 0529754-0981600    | 0536353-0987255                        | 0533588-0996774      | 0534485-0976630   | 0536450-0978838                     | 0538538-0980036    |
|--------------------------------|------------------|-----------------------------------------------|-------------------------------|--------------------------------------------|--------------------|----------------------------------------|----------------------|-------------------|-------------------------------------|--------------------|
| Vegetación <sup>(c)</sup>      | Vismia/Heliconia | Psychotria Solitudinum/<br>Prestoea Decurrens | Amphirox Longifolia/Clusia sp | Guatteria Amplifolia/<br>Melastomoatoaceae | Solanum Rudepanumm | Pentagonia Macrophylla/Attalea Allenii | Psychotria Acuminata | Psychotria Erecta | Siparuna Conica/<br>Calyptragine sp | Prestoea Decurrens |
| Fecha de Muestreo              | 05-Oct-08        | 06-Oct-08                                     | 04-Oct-08                     | 04-Oct-08                                  | 07-Oct-08          | 05-Oct-08                              | 05-Oct-08            | 06-Oct-08         | 06-Oct-08                           | 04-Oct-08          |
| Identificación del Laboratorio | L720815-1        | L720815-2                                     | L720815-3                     | L720815-4                                  | L720815-5          | L720815-6                              | L720815-7            | L720815-8         | L720815-9                           | L720815-10         |
| Matriz                         | Suelo            | Suelo                                         | Suelo                         | Suelo                                      | Suelo              | Suelo                                  | Suelo                | Suelo             | Suelo                               | Suelo              |
| Parámetros Físicos             |                  |                                               |                               |                                            |                    |                                        |                      |                   |                                     |                    |
| pH                             | 4.73             | 4.38                                          | 4.78                          | 4.73                                       | 5.36               | 4.61                                   | 5                    | 4.37              | 5.49                                | 4.93               |
| Metales                        |                  |                                               |                               |                                            |                    |                                        |                      |                   |                                     |                    |
| aluminio                       | 35,500           | 26,300                                        | 60,600                        | 46,800                                     | 34,100             | 16,400                                 | 13,800               | 29,200            | 35,200                              | 25,200             |
| antimonio                      | <10              | <10                                           | <10                           | <10                                        | <10                | <10                                    | <10                  | <10               | <10                                 | <10                |
| arsénico                       | <5.0             | <5.0                                          | <5.0                          | <5.0                                       | <5.0               | <5.0                                   | <5.0                 | <5.0              | <5.0                                | <5.0               |
| bario                          | 57.8             | 10.9                                          | 19.9                          | 76.6                                       | 59.2               | 10.3                                   | 5.8                  | 31.4              | 141                                 | 29.2               |
| berilio                        | <0.50            | <0.50                                         | <0.50                         | <0.50                                      | <0.50              | <0.50                                  | <0.50                | <0.50             | <0.50                               | <0.50              |
| bismuto                        | <20              | <20                                           | <20                           | <20                                        | <20                | <20                                    | <20                  | <20               | <20                                 | <20                |
| boro                           | <10              | <10                                           | 14                            | 12                                         | <10                | <10                                    | <10                  | <10               | <10                                 | <10                |
| cadmio                         | <0.50            | <0.50                                         | 1.16                          | 1.25                                       | 0.57               | <0.50                                  | <0.50                | <0.50             | 1.09                                | <0.50              |
| calcio                         | 624              | 196                                           | 93                            | <50                                        | 763                | 139                                    | 156                  | <50               | 1,310                               | 86                 |
| cromo                          | 15.7             | 22.1                                          | 292                           | 462                                        | 19.8               | 4.5                                    | 2.3                  | 45.5              | 51.7                                | <2.0               |
| cobalto                        | 10.7             | <2.0                                          | 11.3                          | 47.2                                       | 15.4               | <2.0                                   | <2.0                 | <2.0              | 25.2                                | <2.0               |
| cobre                          | 154              | 50.8                                          | 203                           | 649                                        | 252                | 19.7                                   | 11.3                 | 183               | 586                                 | 24.4               |
| hierro                         | 34,000           | 25,700                                        | 126,000                       | 118,000                                    | 50,800             | 9,020                                  | 5,050                | 57,700            | 55,900                              | 30,900             |
| plomo                          | <30              | <30                                           | <30                           | <30                                        | <30                | <30                                    | <30                  | <30               | <30                                 | <30                |
| litio                          | 3.7              | <2.0                                          | 4.9                           | 4.4                                        | 7.2                | <2.0                                   | <2.0                 | 3.1               | 9.1                                 | <2.0               |
| magnesio                       | 1,390            | 496                                           | 407                           | 517                                        | 1,740              | 273                                    | 191                  | 378               | 4,730                               | 586                |
| manganeso                      | 950              | 63.1                                          | 239                           | 2,000                                      | 1,510              | 109                                    | 22.3                 | 24.8              | 1,990                               | 227                |
| mercurio                       | 0.111            | 0.12                                          | 0.157                         | 0.147                                      | 0.153              | 0.0816                                 | 0.0759               | 0.18              | 0.0556                              | 0.0645             |
| molibdeno                      | <4.0             | <4.0                                          | <4.0                          | <4.0                                       | 8.3                | <4.0                                   | 4.1                  | 13.1              | 9.8                                 | <4.0               |
| níquel                         | <5.0             | 5.7                                           | 20.1                          | 26.3                                       | <5.0               | <5.0                                   | <5.0                 | 5.3               | 10.7                                | <5.0               |
| fósforo                        | 426              | 153                                           | 357                           | 303                                        | 629                | 171                                    | 148                  | 214               | 441                                 | 94                 |
| potasio                        | 270              | <200                                          | <200                          | <200                                       | 800                | <200                                   | <200                 | 720               | 550                                 | <200               |
| selenio                        | <3.0             | <2.0                                          | <5.0                          | <7.0                                       | <2.0               | <2.0                                   | <2.0                 | <6.0              | <2.0                                | <3.0               |
| plata                          | <2.0             | <2.0                                          | <2.0                          | <2.0                                       | <2.0               | <2.0                                   | <2.0                 | <2.0              | <2.0                                | <2.0               |
| sodio                          | <200             | <200                                          | <200                          | <200                                       | <200               | <200                                   | <200                 | <200              | <200                                | <200               |
| estroncio                      | 10.4             | 4.43                                          | 2.13                          | 2.02                                       | 11.1               | 2.83                                   | 4.21                 | 7.4               | 18                                  | 4.65               |
| talio                          | <1.0             | <1.0                                          | <1.0                          | <1.0                                       | <1.0               | <1.0                                   | <1.0                 | <1.0              | <1.0                                | <1.0               |
| estaño                         | <5.0             | <5.0                                          | <5.0                          | <5.0                                       | <5.0               | <5.0                                   | <5.0                 | <5.0              | <5.0                                | <5.0               |
| titanio                        | 251              | 191                                           | 342                           | 521                                        | 116                | 429                                    | 563                  | 53.9              | 479                                 | 403                |

| Ubicación de la Muestra        | 0536226-0982152  | 0538340-0981770                               | 0536584-0976500               | 0539137-0978302                            | 0529754-0981600    | 0536353-0987255                        | 0533588-0996774      | 0534485-0976630   | 0536450-0978838                     | 0538538-0980036    |
|--------------------------------|------------------|-----------------------------------------------|-------------------------------|--------------------------------------------|--------------------|----------------------------------------|----------------------|-------------------|-------------------------------------|--------------------|
| Vegetación <sup>(c)</sup>      | Vismia/Heliconia | Psychotria Solitudinum/<br>Prestoea Decurrens | Amphirox Longifolia/Clusia sp | Guatteria Amplifolia/<br>Melastomoatoaceae | Solanum Rudepanumm | Pentagonia Macrophylla/Attalea Allenii | Psychotria Acuminata | Psychotria Erecta | Siparuna Conica/<br>Calyptrigine sp | Prestoea Decurrens |
| Fecha de Muestreo              | 05-Oct-08        | 06-Oct-08                                     | 04-Oct-08                     | 04-Oct-08                                  | 07-Oct-08          | 05-Oct-08                              | 05-Oct-08            | 06-Oct-08         | 06-Oct-08                           | 04-Oct-08          |
| Identificación del Laboratorio | L720815-1        | L720815-2                                     | L720815-3                     | L720815-4                                  | L720815-5          | L720815-6                              | L720815-7            | L720815-8         | L720815-9                           | L720815-10         |
| Matriz                         | Suelo            | Suelo                                         | Suelo                         | Suelo                                      | Suelo              | Suelo                                  | Suelo                | Suelo             | Suelo                               | Suelo              |
| vanadio                        | 104              | 82.6                                          | <u>457</u>                    | <u>389</u>                                 | <u>149</u>         | 55.6                                   | 44.5                 | <u>192</u>        | <u>171</u>                          | 54.4               |
| zinc                           | <u>41.3</u>      | <u>8.1</u>                                    | <u>31.4</u>                   | <u>50.2</u>                                | <u>80.4</u>        | <u>11.5</u>                            | <u>4.6</u>           | <u>15.1</u>       | <u>217</u>                          | <u>23.1</u>        |

<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)  
Los factores propios del área incluyen: i= ingestión de suelo; c = contacto con el suelo; n = provisional; d = contacto directo; p = provisional.  
<sup>(b)</sup> Cuando no se contó con un estándar de CCME aplicable, se utilizó los Niveles de Análisis de Suelos Residenciales Regionales para Contaminantes Químicos en Sitios del Superfondo (Sept 2008) del Laboratorio Nacional de Oakridge (se ajustó las lineamientos para que reflejen un ILCR de 10-5, un HQ de 0.2).  
<sup>(c)</sup> Tipo de vegetación recogida en la ubicación de la muestra de suelo.

< = Menor a la concentración mínima detectable

|            |                                                                                                                                                                  |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>500</u> | subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas                        |
| <b>500</b> | <b>en negrita indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales</b>           |
| <u>500</u> | subrayado/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas              |
| <b>500</b> | <b>en negrita/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales</b> |
| <u>500</u> | <i>subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá</i>                                            |
| <b>500</b> | <b><i>en negrita/en cursiva indica que las concentraciones son mayores que los estándares de suelos de Panamá, otros</i></b>                                     |
| <i>500</i> | <i>en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME</i>                                                            |

Nota: Todas las unidades están en miligramos por kilogramo (mg/kg) a menos que se indique de otro modo

Tabla 2 Tabla de Análisis de Suelos para la Evaluación de Línea Base de los Hidrocarburos Aromáticos Policíclicos

| Ubicación de la Muestra               | Lineamientos para la Salud Hhumana del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Estándares de Suelos de Panamá<br>Otros Usos | Río Caimito | Molejones  | Molejones  | Coclesito  | 0539137-0978302                            | 0534485-0976630   |
|---------------------------------------|---------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------|-------|----------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------------|-------------|------------|------------|------------|--------------------------------------------|-------------------|
| Vegetación                            |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Yuca#1      | Arroz#1    | Yuca#1     | Arroz#1    | Guatteria Amplifolia/<br>Melastomoatoaceae | Psychotria Erecta |
| Fecha de Muestreo                     |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | 29-Ago-08   | 25-Ago-08  | 26-Ago-08  | 27-Ago-08  | 04-Oct-08                                  | 06-Oct-08         |
| Identificación del Laboratorio        |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | L685670-43  | L685670-59 | L685670-74 | L685670-77 | L720815-17                                 | L720815-20        |
| Matriz                                |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Suelo       | Suelo      | Suelo      | Suelo      | Suelo                                      | Suelo             |
| Hidrocarburos Aromáticos Policíclicos |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              |             |            |            |            |                                            |                   |
| acenafteno                            |                                                                                 |       |                                                                                     |       | 21.5                                                                  | i     | 21.5                                                                       | i     | 470                                          |                                              | <0.040      | <0.040     | <0.040     | <0.040     | <0.040                                     | <0.040            |
| acenaftileno                          |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| antraceno                             |                                                                                 |       |                                                                                     |       | 2.5                                                                   | c     | 2.5                                                                        | c     | 100                                          | 45                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| benz(a)antraceno*                     |                                                                                 |       |                                                                                     |       | 6.2                                                                   |       | 6.2                                                                        |       | 100                                          | 10                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| benzo(a)pireno*                       |                                                                                 |       |                                                                                     |       | 0.6                                                                   | i     | 0.6                                                                        | i     | 10                                           | 1                                            | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| benzo(b)fluoranteno*                  |                                                                                 |       |                                                                                     |       | 6.2                                                                   | i     | 6.2                                                                        | i     | 100                                          | 10                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| benzo(g,h,i)perileno*                 |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       | 230                                          |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| benzo(k)fluoranteno*                  |                                                                                 |       |                                                                                     |       | 6.2                                                                   | i     | 6.2                                                                        | i     |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| criseno*                              |                                                                                 |       |                                                                                     |       | 6.2                                                                   | i     | 6.2                                                                        | i     | 900                                          | 90                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| dibenz(a,h)antraceno*                 |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| fluoranteno                           |                                                                                 |       |                                                                                     |       | 50                                                                    | i     | 50                                                                         | i     | 200                                          | 20                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| fluoreno                              |                                                                                 |       |                                                                                     |       | 15.4                                                                  | i     | 15.4                                                                       | i     | 500                                          | 50                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| indeno(1,2,3-c,d)pireno*              |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       | 100                                          | 10                                           | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| 2-metilnaftaleno                      |                                                                                 |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| naftaleno                             | 0.1                                                                             | n     | 0.6                                                                                 | n     | 8.8                                                                   | i     | 8.8                                                                        | i     |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | 0.197                                      | 0.239             |
| fenantreno                            | 0.1                                                                             | n     | 5                                                                                   | n     | 43                                                                    | i     | 43                                                                         | i     |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| pireno                                | 0.1                                                                             | n     | 10                                                                                  | n     | 7.7                                                                   | i     | 7.7                                                                        | i     |                                              |                                              | <0.050      | <0.050     | <0.050     | <0.050     | <0.050                                     | <0.050            |
| B[a]P TPE                             | 5.3                                                                             |       | 5.3                                                                                 |       |                                                                       |       |                                                                            |       |                                              |                                              | 0.12        | 0.12       | 0.12       | 0.12       | 0.12                                       | 0.12              |

Notas:  
<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)

Los factores propios del área incluyen: i= ingestión de suelo y alimentos; c = contacto con el suelo; n = directriz interina sustituida

\* B[a]P TPE – Equivalentes totales de potencia es la suma de la potencia cancerígena estimada relativa a B[a]P usando los siguientes factores de equivalencia de potencia: benz(a)antraceno = 0.1, benzo(a)pireno = 1; benzo(b)fluoranteno = 0.1; benzo(k)fluoranteno = 0.1; criseno = 0.01; benzo(g,h,i)perileno = 0.01; dibenz(a,h)antraceno = 1; indeno(1,2,3-c,d)pireno = 0.1. Cuando no se detectó un parámetro, se utilizó la mitad del límite de detección.

< = Menor a la concentración mínima detectable

|            |
|------------|
| <u>500</u> |
| <b>500</b> |
| <u>500</u> |
| <b>500</b> |
| <u>500</u> |
| <b>500</b> |
| 500        |

subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas

**en negrita indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales**

subrayado/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas

**en negrita/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales**

*subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá*

**en negrita/en cursiva indica que las concentraciones son mayores que los estándares de suelos de Panamá, otros**

*en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME*

Tabla 3 Tabla de Análisis de Suelos para la Evaluación de Línea de Base de losBifenilos Policlorados (PCB)

| Ubicación de la Muestra        | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas          | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Estándares de Suelos de Panamá<br>Otros Usos | Río Caimito | Molejones  | Molejones  | Coclesito  | 0539137-0978302                            | 0534485-0976630   |
|--------------------------------|--------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------|-------|----------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------------|-------------|------------|------------|------------|--------------------------------------------|-------------------|
| Identificación de la Muestra   |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       |                                              |                                              | Yuca#1      | Arroz#1    | Yuca#1     | Arroz#1    | Guatteria Amplifolia/<br>Melastomoatoaceae | Psychotria Erecta |
| Fecha de Muestreo              |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       |                                              |                                              | 29-Ago-08   | 25-Ago-08  | 26-Ago-08  | 27-Ago-08  | 04-Oct-08                                  | 06-Oct-08         |
| Identificación del Laboratorio |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       |                                              |                                              | L685670-43  | L685670-59 | L685670-74 | L685670-77 | L720815-17                                 | L720815-20        |
| Matriz                         |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       |                                              |                                              | Suelo       | Suelo      | Suelo      | Suelo      | Suelo                                      | Suelo             |
| <b>Bifenilos Policlorados</b>  |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       |                                              |                                              |             |            |            |            |                                            |                   |
| PCB-1016                       |                                                                                |       | 0.78                                                                                | <sup>(b)</sup> |                                                                       |       |                                                                            |       |                                              |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1221                       |                                                                                |       | 1.7                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       |                                              |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1232                       |                                                                                |       | 1.7                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       |                                              |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1242                       |                                                                                |       | 2.2                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       | 0.3                                          |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1248                       |                                                                                |       | 2.2                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       | -                                            |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1254                       |                                                                                |       | 2.2                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       | 0.3                                          |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1260                       |                                                                                |       | 2.2                                                                                 | <sup>(b)</sup> |                                                                       |       |                                                                            |       | 0.3                                          |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1262                       |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       | -                                            |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB-1268                       |                                                                                |       |                                                                                     |                |                                                                       |       |                                                                            |       | -                                            |                                              | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |
| PCB Totales                    |                                                                                |       | 2.4                                                                                 | <sup>(b)</sup> | 1.3                                                                   | t     | 1.3                                                                        | t     | 8                                            | 0.8                                          | <0.010      | <0.015     | <0.020     | <0.015     | <0.0016                                    | <0.0015           |

<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)

Los factores propios del área incluyen: t= consumidor terciario

<sup>(b)</sup> Cuando no se contó con un estándar de CCME aplicable, se utilizó los Niveles de Análisis de Suelos Residenciales Regionales para Contaminantes Químicos en sitios del Superfondo (Sept, 2008) del Laboratorio Nacional de Oakridge (se ajustó las lineamientos para que reflejen un ILCR de 10-5, un HQ de 0.2)

< = Menor a la concentración mínima detectable

|     |                                                                                                                                                           |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 500 | subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas                 |
| 500 | en negrita indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales           |
| 500 | subrayado/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas       |
| 500 | en negrita/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales |
| 500 | subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá                                            |
| 500 | en negrita/en cursiva indica que las concentraciones son mayores que los estándares de suelos de Panamá, otros                                            |
| 500 | en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME                                                            |

Nota: Todas las unidades están en miligramos por kilogramo (mg/kg) a menos que se indique de otro modo



Tabla 4 Tabla de Análisis de Suelos para la Evaluación de Línea Base de los Pesticidas

| Ubicación de la Muestra        | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Estándares de Suelos de Panamá<br>Otros Usos | Río Caimito | Molejones  | Molejones  | Coclesito  | 0539137-0978302                            | 0534485-0976630   |
|--------------------------------|--------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------|-------|----------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------------|-------------|------------|------------|------------|--------------------------------------------|-------------------|
| Identificación de la Muestra   |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Yuca#1      | Arroz#1    | Yuca#1     | Arroz#1    | Guatteria Amplifolia/<br>Melastomoatoaceae | Psychotria Erecta |
| Fecha de Muestreo              |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | 29-Ago-08   | 25-Ago-08  | 26-Ago-08  | 27-Ago-08  | 04-Oct-08                                  | 06-Oct-08         |
| Identificación del Laboratorio |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | L685670-43  | L685670-59 | L685670-74 | L685670-77 | L720815-17                                 | L720815-20        |
| Matriz                         |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Suelo       | Suelo      | Suelo      | Suelo      | Suelo                                      | Suelo             |
| Pesticidas Organoclorados      |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              |             |            |            |            |                                            |                   |
| aldrín                         |                                                                                |       | 0.29                                                                                | (b)   |                                                                       |       |                                                                            |       | 4                                            | 0.4                                          | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| alfa-BHC                       |                                                                                |       | 0.77                                                                                | (b)   |                                                                       |       |                                                                            |       | 7                                            | 0.7                                          | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| beta-BHC                       |                                                                                |       | 2.7                                                                                 | (b)   |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.0020     | <0.0020    | <0.0020    | <0.0020    | <0.0020                                    | <0.0020           |
| lindano (gamma - BHC)          |                                                                                |       | 5.2                                                                                 | (b)   |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| delta-BHC                      |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       | 0.5                                          |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| cis-clordano (alfa)            |                                                                                |       | 16                                                                                  | (b)   |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| trans-clordano (gamma)         |                                                                                |       | 16                                                                                  | (b)   |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| 2,4'-DDD                       |                                                                                |       | 20                                                                                  | (b)   |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| 4,4'-DDD                       |                                                                                |       | 20                                                                                  | (b)   |                                                                       |       |                                                                            |       | 300                                          | 30                                           | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| 2,4'-DDE                       |                                                                                |       | 14                                                                                  | (b)   |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| 4,4'-DDE                       |                                                                                |       | 14                                                                                  | (b)   |                                                                       |       |                                                                            |       | 200                                          | 20                                           | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| 2,4'-DDT                       |                                                                                |       | 17                                                                                  | (b)   | 0.7                                                                   | s     | 0.7                                                                        | s     |                                              |                                              | <0.0020     | <0.0020    | <0.0020    | <0.0020    | <0.0020                                    | <0.0020           |
| 4,4'-DDT                       |                                                                                |       | 17                                                                                  | (b)   | 0.7                                                                   | s     | 0.7                                                                        | s     | 200                                          | 20                                           | <0.0020     | <0.0020    | <0.0020    | <0.0020    | <0.0020                                    | <0.0020           |
| dieldrín                       |                                                                                |       | 0.3                                                                                 | (b)   |                                                                       |       |                                                                            |       | 4                                            | 0.4                                          | <0.0050     | <0.0070    | <0.0090    | <0.0080    | <0.0020                                    | <0.0020           |
| endosulfán I                   |                                                                                |       | 74                                                                                  | (b)   |                                                                       |       |                                                                            |       | 47                                           |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| endosulfán II                  |                                                                                |       | 74                                                                                  | (b)   |                                                                       |       |                                                                            |       | 47                                           |                                              | <0.0050     | <0.0070    | <0.0090    | <0.0080    | <0.0016                                    | <0.0015           |
| sulfato de endosulfán          |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       | 47                                           |                                              | <0.0050     | <0.0070    | <0.0090    | <0.0080    | <0.0016                                    | <0.0015           |
| endrín                         |                                                                                |       | 3.6                                                                                 | (b)   |                                                                       |       |                                                                            |       | 10                                           | 1                                            | <0.0050     | <0.0070    | <0.010     | <0.0080    | <0.0050                                    | <0.0050           |
| heptacloro                     |                                                                                |       | 1.1                                                                                 | (b)   |                                                                       |       |                                                                            |       | 0.2                                          |                                              | <0.0020     | <0.0020    | <0.0020    | <0.0020    | <0.0020                                    | <0.0020           |
| heptacloro epóxido             |                                                                                |       | 0.53                                                                                | (b)   |                                                                       |       |                                                                            |       | 7                                            | 0.7                                          | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| metoxicloro                    |                                                                                |       | 62                                                                                  | (b)   |                                                                       |       |                                                                            |       | 280                                          |                                              | <0.0050     | <0.0070    | <0.0090    | <0.0080    | <0.0050                                    | <0.0050           |
| mirex                          |                                                                                |       | 0.27                                                                                | (b)   |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |



Tabla 4 Tabla de Análisis de Suelos para la Evaluación de Línea Base de los Pesticidas (continuación)

| Ubicación de la Muestra        | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Tierras Agrícolas | Notas | Lineamientos Ambientales del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Estándares de Suelos de Panamá<br>Otros Usos | Río Caimito | Molejones  | Molejones  | Coclesito  | 0539137-0978302                            | 0534485-0976630   |
|--------------------------------|--------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------|-------|----------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------------|-------------|------------|------------|------------|--------------------------------------------|-------------------|
| Identificación de la Muestra   |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Yuca#1      | Arroz#1    | Yuca#1     | Arroz#1    | Guatteria Amplifolia/<br>Melastomoatoaceae | Psychotria Erecta |
| Fecha de Muestreo              |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | 29-Ago-08   | 25-Ago-08  | 26-Ago-08  | 27-Ago-08  | 04-Oct-08                                  | 06-Oct-08         |
| Identificación del Laboratorio |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | L685670-43  | L685670-59 | L685670-74 | L685670-77 | L720815-17                                 | L720815-20        |
| Matriz                         |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | Suelo       | Suelo      | Suelo      | Suelo      | Suelo                                      | Suelo             |
| cis-nonacloro                  |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| trans-nonacloro                |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |
| oxiclordano                    |                                                                                |       |                                                                                     |       |                                                                       |       |                                                                            |       |                                              |                                              | <0.0010     | <0.0014    | <0.0020    | <0.0015    | <0.0016                                    | <0.0015           |

<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)

Los factores propios del área incluyen: s= consumidor secundario (aves)

<sup>(b)</sup> Cuando no se contó con un estándar de CCME aplicable, se utilizó los Niveles de Análisis de Suelos Residenciales Regionales para Contaminantes Químicos en Sitios del Superfondo (Sept, 2008) del Laboratorio Nacional de Oakridge (se ajustó las lineamientos para que reflejen un ILCR de 10-5, un HQ de 0.2)

< = Menor a la concentración mínima detectable

|            |                                                                                                                                                     |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>500</u> | subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas           |
| <b>500</b> | en negrita indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales     |
| <u>500</u> | subrayado/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de las tierras agrícolas |
| <b>500</b> | en negrita/sombreado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME de los terrenos residenciales    |
| <i>500</i> | subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá                                      |
| <b>500</b> | en negrita/en cursiva indica que las concentraciones son mayores que los estándares de suelos de Panamá, otros                                      |
| <i>500</i> | en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME                                                      |

Nota: Todas las unidades están en miligramos por kilogramo (mg/kg) a menos que se indique de otro modo

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |               |               |               |        |         |               |        |               |        |
|----------------------------------|----------------|-------------------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|---------------|---------------|---------------|--------|---------|---------------|--------|---------------|--------|
|                                  |                |                                                                                     |       |                                              | W-1                                    |               |               |               |        | W-2     |               |        |               |        |
|                                  |                |                                                                                     |       |                                              | Sept-07                                | Oct-07        | Nov-07        | Sept-08       | Nov-08 | Sept-07 | Oct-07        | Nov-07 | Sept-08       | Nov-08 |
| Parámetros Convencionales        |                |                                                                                     |       |                                              |                                        |               |               |               |        |         |               |        |               |        |
| pH                               | unidades de pH | -                                                                                   |       | -                                            | -                                      | 6.5           | 6             | 6.6           | -      | -       | 6.6           | -      | 5.8           | -      |
| cianuro total                    | µg/g           | <u>29</u>                                                                           | i     | 40                                           | -                                      | -             | <0.15         | -             | -      | -       | -             | -      | -             | -      |
| humedad                          | %              | -                                                                                   |       | -                                            | -                                      | -             | 35.2          | 25.7          | -      | -       | -             | -      | -             | -      |
| Metilmercurio                    |                |                                                                                     |       |                                              |                                        |               |               |               |        |         |               |        |               |        |
| metilmercurio                    |                |                                                                                     |       |                                              |                                        |               |               | -             | -      |         |               |        | -             | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                                     |       |                                              |                                        |               |               |               |        |         |               |        |               |        |
| aluminio                         | µg/g           | -                                                                                   |       | -                                            | -                                      | 22,100        | 16,600        | 28,600        | -      | -       | 19,900        | -      | 23,500        | -      |
| antimonio                        | µg/g           | <u>20</u>                                                                           | n     | -                                            | -                                      | <10           | <0.1          | <0.1          | -      | -       | <10           | -      | <0.1          | -      |
| arsénico                         | µg/g           | <u>12</u>                                                                           | i     | 20                                           | -                                      | <10           | 2.3           | 1.7           | -      | -       | <10           | -      | 2             | -      |
| bario                            | µg/g           | <u>500</u>                                                                          | n     | 100                                          | -                                      | 40            | 52            | 49            | -      | -       | 50            | -      | 80            | -      |
| berilio                          | µg/g           | <u>4</u>                                                                            | n     | -                                            | -                                      | <1            | <1            | <1            | -      | -       | <1            | -      | <1            | -      |
| boro                             | µg/g           | -                                                                                   |       | -                                            | -                                      | <1            | <1            | <1            | -      | -       | <1            | -      | <1            | -      |
| cadmio                           | µg/g           | <u>14</u>                                                                           | i     | 5                                            | -                                      | <0.5          | 0.2           | <0.2          | -      | -       | <0.5          | -      | 0.2           | -      |
| calcio                           | µg/g           | -                                                                                   |       | -                                            | -                                      | 571           | 391           | 454           | -      | -       | 742           | -      | 560           | -      |
| cromo                            | µg/g           | <u>220</u>                                                                          | i     | 100                                          | -                                      | 21            | 19            | 18            | -      | -       | 41            | -      | 27            | -      |
| cobalto                          | µg/g           | <u>50</u>                                                                           | n     | -                                            | -                                      | 17            | 20            | 17            | -      | -       | 12            | -      | 14            | -      |
| cobre                            | µg/g           | <u>1,100</u>                                                                        | i     | -                                            | -                                      | 988           | 737           | 761           | -      | -       | 321           | -      | 325           | -      |
| hierro                           | µg/g           | <u>11,000</u>                                                                       | (b)   | NA                                           | -                                      | <u>45,100</u> | <u>58,600</u> | <u>59,800</u> | -      | -       | <u>49,100</u> | -      | <u>55,300</u> | -      |
| plomo                            | µg/g           | <u>140</u>                                                                          | i     | -                                            | -                                      | 25            | 22.9          | 13.5          | -      | -       | 27            | -      | 14.6          | -      |
| magnesio                         | µg/g           | -                                                                                   |       | -                                            | -                                      | 5,560         | 3,240         | 5,360         | -      | -       | 5,500         | -      | 5,370         | -      |
| manganeso                        | µg/g           | <u>360</u>                                                                          | (b)   | -                                            | -                                      | <u>922</u>    | <u>806</u>    | <u>852</u>    | -      | -       | <u>709</u>    | -      | <u>556</u>    | -      |
| mercurio                         | µg/g           | <u>6.6</u>                                                                          | i     | 14                                           | -                                      | <0.01         | 0.02          | <0.01         | -      | -       | <0.01         | -      | 0.01          | -      |
| molibdeno                        | µg/g           | <u>10</u>                                                                           | n     | -                                            | -                                      | <u>37</u>     | <u>18.4</u>   | <u>34.8</u>   | -      | -       | <u>11</u>     | -      | 9.2           | -      |
| níquel                           | µg/g           | <u>320</u>                                                                          | (b)   | 40                                           | -                                      | 5             | 5             | 4             | -      | -       | 6             | -      | 6             | -      |
| fósforo                          | µg/g           | -                                                                                   |       | -                                            | -                                      | 575           | 326           | 465           | -      | -       | 520           | -      | 358           | -      |
| potasio                          | µg/g           | -                                                                                   |       | -                                            | -                                      | 476           | 303           | 494           | -      | -       | 300           | -      | 334           | -      |
| selenio                          | µg/g           | <u>80</u>                                                                           | d     | 63                                           | -                                      | <2            | 1.7           | 1.6           | -      | -       | <2            | -      | 0.8           | -      |
| plata                            | µg/g           | <u>20</u>                                                                           | n     | -                                            | -                                      | <2            | 0.2           | 0.1           | -      | -       | <2            | -      | <0.1          | -      |
| sodio                            | µg/g           | -                                                                                   |       | -                                            | -                                      | 31            | 8             | 16            | -      | -       | 36            | -      | 12            | -      |
| estroncio                        | µg/g           | <u>9,400</u>                                                                        | (b)   | -                                            | -                                      | 6             | 7             | 6             | -      | -       | 9             | -      | 8             | -      |
| talio                            | µg/g           | <u>1</u>                                                                            | p     | -                                            | -                                      | -             | <0.1          | <0.1          | -      | -       | -             | -      | <0.1          | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |            |         |        |         |            |        |            |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|------------|---------|--------|---------|------------|--------|------------|--------|
|                                                             |          |                                                                                     |       |                                              | W-1                                    |        |            |         |        | W-2     |            |        |            |        |
|                                                             |          |                                                                                     |       |                                              | Sept-07                                | Oct-07 | Nov-07     | Sept-08 | Nov-08 | Sept-07 | Oct-07     | Nov-07 | Sept-08    | Nov-08 |
| estaño                                                      | µg/g     | <u>50</u>                                                                           | n     | -                                            | -                                      | <5     | <5         | <5      | -      | -       | <5         | -      | <5         | -      |
| titanio                                                     | µg/g     | -                                                                                   |       | -                                            | -                                      | 136    | 88         | 127     | -      | -       | 200        | -      | 208        | -      |
| vanadio                                                     | µg/g     | <u>110</u>                                                                          | (b)   | -                                            | -                                      | 103    | <u>110</u> | 96      | -      | -       | <u>142</u> | -      | <u>126</u> | -      |
| zinc                                                        | µg/g     | <u>4,600</u>                                                                        | (b)   | 30                                           | -                                      | 117    | 105        | 100     | -      | -       | 188        | -      | 169        | -      |
| zirconio                                                    | µg/g     | -                                                                                   |       | -                                            | -                                      | 4      | 2          | 1       | -      | -       | 4          | -      | 2          | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                                     |       |                                              |                                        |        |            |         |        |         |            |        |            |        |
| 2,4-D                                                       | µg/g     | <u>138</u>                                                                          | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| 2,4-DB                                                      | µg/g     | <u>98</u>                                                                           | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| 2,4,5-T                                                     | µg/g     | <u>122</u>                                                                          | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| 2,4,5-TP                                                    | µg/g     | <u>98</u>                                                                           | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| dicamba                                                     | µg/g     | <u>360</u>                                                                          | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| MCPA                                                        | µg/g     | <u>6.2</u>                                                                          | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| MCPP                                                        | µg/g     | <u>12.2</u>                                                                         | (b)   | -                                            | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |
| piclorán                                                    | µg/g     | <u>860</u>                                                                          | (b)   | -                                            | -                                      | -      | <0.1       | <0.1    | -      | -       | -          | -      | -          | -      |
| Hidrocarburos Volátiles Monocíclicos –Inyección Directa     |          |                                                                                     |       |                                              |                                        |        |            |         |        |         |            |        |            |        |
| benceno                                                     | µg/g     | <u>11</u>                                                                           | i     | 10                                           | -                                      | -      | <0.005     | <0.03   | -      | -       | -          | -      | -          | -      |
| etilbenceno                                                 | µg/g     | <u>10,000</u>                                                                       | i     | 20                                           | -                                      | -      | <0.018     | <0.03   | -      | -       | -          | -      | -          | -      |
| tolueno                                                     | µg/g     | <u>22,000</u>                                                                       | i     | 300                                          | -                                      | -      | <0.02      | <0.03   | -      | -       | -          | -      | -          | -      |
| xilenos                                                     | µg/g     | <u>150,000</u>                                                                      | i     | 100                                          | -                                      | -      | <0.02      | <0.03   | -      | -       | -          | -      | -          | -      |
| estireno                                                    | µg/g     | <u>5</u>                                                                            | n     | -                                            | -                                      | -      | -          | -       | -      | -       | -          | -      | -          | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción De Metanol |          |                                                                                     |       |                                              |                                        |        |            |         |        |         |            |        |            |        |
| hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                                   |       | -                                            | -                                      | -      | -          | -       | -      | -       | -          | -      | -          | -      |
| hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                                   |       | -                                            | -                                      | -      | -          | -       | -      | -       | -          | -      | -          | -      |
| Pesticidas Organoclorados                                   |          |                                                                                     |       |                                              |                                        |        |            |         |        |         |            |        |            |        |
| aldrín                                                      | µg/g     | <u>0.29</u>                                                                         | (b)   | 4                                            | -                                      | -      | <0.001     | <0.001  | -      | -       | -          | -      | -          | -      |
| alfa-BHC                                                    | µg/g     | <u>0.77</u>                                                                         | (b)   | 7                                            | -                                      | -      | <0.001     | <0.001  | -      | -       | -          | -      | -          | -      |
| beta-BHC                                                    | µg/g     | <u>2.7</u>                                                                          | (b)   | 10                                           | -                                      | -      | <0.001     | <0.001  | -      | -       | -          | -      | -          | -      |
| delta-BHC                                                   | µg/g     | -                                                                                   |       | 0.5                                          | -                                      | -      | <0.001     | <0.001  | -      | -       | -          | -      | -          | -      |
| gamma-BHC (Lindano)                                         | µg/g     | <u>5.2</u>                                                                          | (b)   | 10                                           | -                                      | -      | <0.001     | <0.001  | -      | -       | -          | -      | -          | -      |
| alpha-clordano                                              | µg/g     | <u>16</u>                                                                           | (b)   | 10                                           | -                                      | -      | <0.005     | <0.005  | -      | -       | -          | -      | -          | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                                     |       |                                              | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                       |          |                                                                                     |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-clordano        | µg/g     | <u>16</u>                                                                           | (b)   | 10                                           | -                                      | -      | <0.005 | <0.005  | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                                           | (b)   | 300                                          | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                                           | (b)   | 300                                          | -                                      | -      | <0.005 | <0.005  | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                                           | (b)   | 200                                          | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                                           | (b)   | 200                                          | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                                           | (b)   | 200                                          | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                                           | (b)   | 200                                          | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| dieldrín              | µg/g     | <u>0.3</u>                                                                          | (b)   | 4                                            | -                                      | -      | <0.003 | <0.003  | -      | -       | -      | -      | -       | -      |
| endosulfán I          | µg/g     | <u>74</u>                                                                           | (b)   | 47                                           | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| endosulfán II         | µg/g     | <u>74</u>                                                                           | (b)   | 47                                           | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| sulfato de endosulfán | µg/g     | -                                                                                   |       | 47                                           | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| endrín                | µg/g     | <u>3.6</u>                                                                          | (b)   | 10                                           | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| endrín aldehído       | µg/g     | -                                                                                   |       | -                                            | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| heptacloro            | µg/g     | <u>1.1</u>                                                                          | (b)   | 0.2                                          | -                                      | -      | <0.001 | <0.001  | -      | -       | -      | -      | -       | -      |
| heptacloro epóxido    | µg/g     | <u>0.53</u>                                                                         | (b)   | 7                                            | -                                      | -      | <0.001 | <0.001  | -      | -       | -      | -      | -       | -      |
| metoxicloro           | µg/g     | <u>62</u>                                                                           | (b)   | 280                                          | -                                      | -      | <0.01  | <0.01   | -      | -       | -      | -      | -       | -      |
| toxafeno              | µg/g     | -                                                                                   |       | -                                            | -                                      | -      | <0.3   | <0.3    | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------|----------------|-------------------------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                  |                |                                                                                     |       |                                           | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                  |                |                                                                                     |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales        |                |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| pH                               | unidades de pH | -                                                                                   |       | -                                         |                                        |        |        |         |        |         |        |        |         |        |
| cianuro total                    | µg/g           | 29                                                                                  | i     | 40                                        |                                        |        |        |         |        |         |        |        |         |        |
| humedad                          | %              | -                                                                                   |       | -                                         |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                    |                |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                    |                |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Metales Solubles en Ácido Fuerte |                |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| aluminio                         | µg/g           | -                                                                                   |       | -                                         | -                                      | 10,800 | -      | 8,900   | 8,060  | 12,700  | 11,700 | 12,400 | 16,800  | 16,500 |
| antimonio                        | µg/g           | 20                                                                                  | n     | -                                         | -                                      | <10    | -      | <0.1    | <0.1   | <0.1    | <0.1   | <0.1   | <0.1    | <0.1   |
| arsénico                         | µg/g           | 12                                                                                  | i     | 20                                        | -                                      | <10    | -      | 0.1     | 0.3    | 2.7     | 2.9    | 2.4    | 2.1     | 2      |
| bario                            | µg/g           | 500                                                                                 | n     | 100                                       | -                                      | 112    | -      | 34      | 37     | 64      | 58     | 85     | 100     | 76     |
| berilio                          | µg/g           | 4                                                                                   | n     | -                                         | -                                      | <1     | -      | <1      | <1     | <1      | <1     | <1     | <1      | <1     |
| boro                             | µg/g           | -                                                                                   |       | -                                         | -                                      | <1     | -      | <1      | <1     | 2       | <1     | <1     | 1       | <1     |
| cadmio                           | µg/g           | 14                                                                                  | i     | 5                                         | -                                      | <0.5   | -      | <0.2    | <0.2   | <0.2    | <0.2   | <0.2   | <0.2    | <0.2   |
| calcio                           | µg/g           | -                                                                                   |       | -                                         | -                                      | 1,720  | -      | 408     | 483    | 1,000   | 1,620  | 929    | 1,210   | 1,210  |
| cromo                            | µg/g           | 220                                                                                 | i     | 100                                       | -                                      | 14     | -      | <2      | 11     | 22      | 29     | 15     | 20      | 13     |
| cobalto                          | µg/g           | 50                                                                                  | n     | -                                         | -                                      | 10     | -      | 2       | 5      | 16      | 13     | 21     | 21      | 18     |
| cobre                            | µg/g           | 1,100                                                                               | i     | -                                         | -                                      | 124    | -      | 21      | 53     | 46      | 38     | 61     | 61      | 53     |
| hierro                           | µg/g           | 11,000                                                                              | (b)   | -N/A                                      | -                                      | 19,400 | -      | 9,830   | 12,200 | 54,400  | 36,300 | 51,500 | 64,500  | 34,700 |
| plomo                            | µg/g           | 140                                                                                 | i     | -                                         | -                                      | 9      | -      | 1.8     | 3.5    | 6.6     | 4.6    | 6.5    | 6.7     | 6.4    |
| magnesio                         | µg/g           | -                                                                                   |       | -                                         | -                                      | 1,120  | -      | 567     | 1,170  | 2,660   | 3,520  | 2,120  | 3,400   | 1,770  |
| manganeso                        | µg/g           | 360                                                                                 | (b)   | -                                         | -                                      | 963    | -      | 162     | 269    | 706     | 696    | 857    | 790     | 916    |
| mercurio                         | µg/g           | 6.6                                                                                 | i     | 14                                        | -                                      | 0.05   | -      | <0.01   | <0.01  | 0.01    | <0.01  | 0.01   | 0.01    | 0.02   |
| molibdeno                        | µg/g           | 10                                                                                  | n     | -                                         | -                                      | <4     | -      | 0.3     | 1.1    | 0.9     | 1.1    | 1.3    | 1.4     | 1.2    |
| níquel                           | µg/g           | 320                                                                                 | (b)   | 40                                        | -                                      | 4      | -      | <2      | 3      | 5       | 5      | 6      | 5       | 4      |
| fósforo                          | µg/g           | -                                                                                   |       | -                                         | -                                      | 308    | -      | 192     | 137    | 325     | 387    | 283    | 387     | 293    |
| potasio                          | µg/g           | -                                                                                   |       | -                                         | -                                      | 198    | -      | 57      | 161    | 230     | 223    | 334    | 427     | 360    |
| selenio                          | µg/g           | 80                                                                                  | d     | 63                                        | -                                      | <2     | -      | <0.2    | 0.3    | 0.3     | 0.5    | 0.6    | 0.3     | 0.6    |
| plata                            | µg/g           | 20                                                                                  | n     | -                                         | -                                      | <2     | -      | <0.1    | <0.1   | <0.1    | <0.1   | <0.1   | <0.1    | 0.1    |
| sodio                            | µg/g           | -                                                                                   |       | -                                         | -                                      | 147    | -      | 9       | 23     | 43      | 101    | 31     | 41      | 30     |
| estroncio                        | µg/g           | 9,400                                                                               | (b)   | -                                         | -                                      | 23     | -      | 8       | 8      | 11      | 14     | 9      | 13      | 11     |
| talio                            | µg/g           | 1                                                                                   | p     | -                                         | -                                      | -      | -      | <0.1    | <0.1   | <0.1    | <0.1   | <0.1   | <0.1    | <0.1   |
| estaño                           | µg/g           | 50                                                                                  | n     | -                                         | -                                      | <5     | -      | <5      | <5     | <5      | <5     | <5     | <5      | <5     |
| titanio                          | µg/g           | -                                                                                   |       | -                                         | -                                      | 110    | -      | 211     | 236    | 366     | 134    | 90     | 217     | 71     |
| vanadio                          | µg/g           | 110                                                                                 | (b)   | -                                         | -                                      | 57     | -      | 40      | 50     | 148     | 81     | 104    | 130     | 94     |
| zinc                             | µg/g           | 4,600                                                                               | (b)   | 30                                        | -                                      | 74     | -      | 26      | 42     | 69      | 62     | 56     | 68      | 44     |
| zirconio                         | µg/g           | -                                                                                   |       | -                                         | -                                      | 1      | -      | 2       | 1      | 4       | 2      | 3      | 5       | 3      |
| Herbicidas Ácidos Clorados       |                |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                            | µg/g           | 138                                                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| 2,4-DB                           | µg/g           | 98                                                                                  | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME <sup>(a)</sup><br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                                     |       |                                           | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                                             |          |                                                                                     |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| 2,4,5-T                                                     | µg/g     | 122                                                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| 2,4,5-TP                                                    | µg/g     | 98                                                                                  | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| dicamba                                                     | µg/g     | 360                                                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| MCPA                                                        | µg/g     | 6.2                                                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| MCPP                                                        | µg/g     | 12.2                                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| piclorán                                                    | µg/g     | 860                                                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | <0.1    | <0.1   |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                     | µg/g     | 11                                                                                  | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.03   | -      |
| etilbenceno                                                 | µg/g     | 10,000                                                                              | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.018 | <0.03   | -      |
| tolueno                                                     | µg/g     | 22,000                                                                              | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | <0.03   | -      |
| xilenos                                                     | µg/g     | 150,000                                                                             | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | <0.03   | -      |
| estireno                                                    | µg/g     | 5                                                                                   | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción De Metanol |          |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                                     |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                      | µg/g     | 0.29                                                                                | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| alfa-BHC                                                    | µg/g     | 0.77                                                                                | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| beta-BHC                                                    | µg/g     | 2.7                                                                                 | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| delta-BHC                                                   | µg/g     | -                                                                                   |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| gamma-BHC (lindano)                                         | µg/g     | 5.2                                                                                 | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| alpha-clordano                                              | µg/g     | 16                                                                                  | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| gamma-clordano                                              | µg/g     | 16                                                                                  | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| o,p-DDD                                                     | µg/g     | 20                                                                                  | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| p,p-DDD                                                     | µg/g     | 20                                                                                  | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.005  | <0.005 |
| o,p-DDE                                                     | µg/g     | 14                                                                                  | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| p,p-DDE                                                     | µg/g     | 14                                                                                  | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| o,p-DDT                                                     | µg/g     | 17                                                                                  | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| p,p-DDT                                                     | µg/g     | 17                                                                                  | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| dieldrín                                                    | µg/g     | 0.3                                                                                 | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.003 | <0.003  | <0.003 |
| endosulfán I                                                | µg/g     | 74                                                                                  | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| endosulfán II                                               | µg/g     | 74                                                                                  | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| sulfato de endosulfán                                       | µg/g     | -                                                                                   |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| endrín                                                      | µg/g     | 3.6                                                                                 | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| endrín aldehído                                             | µg/g     | -                                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| heptacloro                                                  | µg/g     | 1.1                                                                                 | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| heptacloro epóxido                                          | µg/g     | 0.53                                                                                | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.001 | <0.001  | <0.001 |
| metoxicloro                                                 | µg/g     | 62                                                                                  | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.01   | <0.01  |
| toxafeno                                                    | µg/g     | -                                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.3   | <0.3    | <0.3   |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------|----------------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                  |                |                                                                   |       |                                           | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                  |                |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales        |                |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| pH                               | unidades de pH | -                                                                 |       | -                                         | -                                      | -      | 6.7    | 6.4     | 7.1    | -       | 6.4    | -      | 5.6     | 6.4    |
| cianuro total                    | µg/g           | 29                                                                | i     | 40                                        | -                                      | -      | <0.15  | -       | -      | -       | -      | -      | -       | -      |
| humedad                          | %              | -                                                                 |       | -                                         | -                                      | -      | 27.5   | 23.4    | 23.1   | -       | -      | -      | -       | -      |
| Metilmercurio                    |                |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                    |                |                                                                   |       |                                           |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| aluminio                         | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 9,960  | 13,900  | 10,700 | -       | 30,600 | -      | 34,900  | 24,400 |
| antimonio                        | µg/g           | 20                                                                | n     | -                                         | -                                      | -      | <0.1   | <0.1    | <0.1   | -       | <10    | -      | <0.1    | <0.1   |
| arsénico                         | µg/g           | 12                                                                | i     | 20                                        | -                                      | -      | 1.4    | 1.4     | 1.8    | -       | <10    | -      | 3.1     | 2.5    |
| bario                            | µg/g           | 500                                                               | n     | 100                                       | -                                      | -      | 52     | 60      | 48     | -       | 118    | -      | 126     | 115    |
| berilio                          | µg/g           | 4                                                                 | n     | -                                         | -                                      | -      | <1     | <1      | <1     | -       | <1     | -      | <1      | <1     |
| boro                             | µg/g           | -                                                                 |       | -                                         | -                                      | -      | <1     | <1      | <1     | -       | <1     | -      | <1      | <1     |
| cadmio                           | µg/g           | 14                                                                | i     | 5                                         | -                                      | -      | <0.2   | <0.2    | <0.2   | -       | <0.5   | -      | <0.2    | <0.2   |
| calcio                           | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 1,260  | 878     | 636    | -       | 2,660  | -      | 975     | 1,550  |
| cromo                            | µg/g           | 220                                                               | i     | 100                                       | -                                      | -      | 116    | 60      | 65     | -       | 25     | -      | 20      | 15     |
| cobalto                          | µg/g           | 50                                                                | n     | -                                         | -                                      | -      | 20     | 16      | 11     | -       | 26     | -      | 27      | 18     |
| cobre                            | µg/g           | 1,100                                                             | i     | -                                         | -                                      | -      | 153    | 222     | 205    | -       | 74     | -      | 83      | 64     |
| hierro                           | µg/g           | 11,000                                                            | (b)   | -N/A                                      | -                                      | -      | 50,700 | 31,400  | 26,600 | -       | 48,500 | -      | 72,300  | 51,200 |
| plomo                            | µg/g           | 140                                                               | i     | -                                         | -                                      | -      | 5.8    | 8.2     | 12.8   | -       | 13     | -      | 6.2     | 5.9    |
| magnesio                         | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 3,930  | 4,430   | 2,820  | -       | 6,800  | -      | 4,280   | 3,840  |
| manganeso                        | µg/g           | 360                                                               | (b)   | -                                         | -                                      | -      | 530    | 644     | 499    | -       | 746    | -      | 709     | 662    |
| mercurio                         | µg/g           | 6.6                                                               | i     | 14                                        | -                                      | -      | 0.01   | <0.01   | <0.01  | -       | 0.02   | -      | 0.03    | 0.03   |
| molibdeno                        | µg/g           | 10                                                                | n     | -                                         | -                                      | -      | 4.6    | 8.6     | 9.1    | -       | <4     | -      | 0.8     | 1.2    |
| níquel                           | µg/g           | 320                                                               | (b)   | 40                                        | -                                      | -      | 24     | 14      | 11     | -       | 10     | -      | 9       | 7      |
| fósforo                          | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 206    | 288     | 247    | -       | 653    | -      | 353     | 371    |
| potasio                          | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 146    | 243     | 235    | -       | 306    | -      | 236     | 295    |
| selenio                          | µg/g           | 80                                                                | d     | 63                                        | -                                      | -      | 0.6    | 1       | 1      | -       | <2     | -      | 0.7     | 0.8    |
| plata                            | µg/g           | 20                                                                | n     | -                                         | -                                      | -      | <0.1   | <0.1    | <0.1   | -       | <2     | -      | <0.1    | <0.1   |
| sodio                            | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 39     | 25      | 32     | -       | 170    | -      | 45      | 59     |
| estroncio                        | µg/g           | 9,400                                                             | (b)   | -                                         | -                                      | -      | 11     | 8       | 6      | -       | 32     | -      | 14      | 20     |
| talio                            | µg/g           | 1                                                                 | p     | -                                         | -                                      | -      | <0.1   | <0.1    | <0.1   | -       | -      | -      | <0.1    | <0.1   |
| estaño                           | µg/g           | 50                                                                | n     | -                                         | -                                      | -      | <5     | <5      | <5     | -       | <5     | -      | <5      | <5     |
| titanio                          | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 318    | 182     | 172    | -       | 419    | -      | 182     | 194    |
| vanadio                          | µg/g           | 110                                                               | (b)   | -                                         | -                                      | -      | 108    | 80      | 70     | -       | 185    | -      | 160     | 105    |
| zinc                             | µg/g           | 4,600                                                             | (b)   | 30                                        | -                                      | -      | 60     | 72      | 62     | -       | 81     | -      | 62      | 62     |
| zirconio                         | µg/g           | -                                                                 |       | -                                         | -                                      | -      | 2      | 1       | 1      | -       | 7      | -      | 3       | 4      |
| Herbicidas Ácidos Clorados       |                |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                            | µg/g           | 138                                                               | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| 2,4-DB                           | µg/g           | 98                                                                | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| 2,4,5-T                          | µg/g           | 122                                                               | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | <0.1   | <0.1    | <0.1   | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | <0.005 | <0.03   | -      | -       | -      | -      | -       | -      |
| etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | <0.018 | <0.03   | -      | -       | -      | -      | -       | -      |
| tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | <0.02  | <0.03   | -      | -       | -      | -      | -       | -      |
| xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | <0.02  | <0.03   | -      | -       | -      | -      | -       | -      |
| estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| gamma-BHC (lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| alpha-clordano                                              | µg/g     | 16                                                                | (b)   | 10                                        | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| gamma-clordano                                              | µg/g     | 16                                                                | (b)   | 10                                        | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| o,p-DDD                                                     | µg/g     | 20                                                                | (b)   | 300                                       | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| p,p-DDD                                                     | µg/g     | 20                                                                | (b)   | 300                                       | -                                      | -      | <0.005 | <0.005  | <0.005 | -       | -      | -      | -       | -      |
| o,p-DDE                                                     | µg/g     | 14                                                                | (b)   | 200                                       | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| p,p-DDE                                                     | µg/g     | 14                                                                | (b)   | 200                                       | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| o,p-DDT                                                     | µg/g     | 17                                                                | (b)   | 200                                       | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| p,p-DDT                                                     | µg/g     | 17                                                                | (b)   | 200                                       | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| dieldrín                                                    | µg/g     | 0.3                                                               | (b)   | 4                                         | -                                      | -      | <0.003 | <0.003  | <0.003 | -       | -      | -      | -       | -      |
| endosulfán I                                                | µg/g     | 74                                                                | (b)   | 47                                        | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| endosulfán II                                               | µg/g     | 74                                                                | (b)   | 47                                        | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| sulfato de endosulfán                                       | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| endrín                                                      | µg/g     | 3.6                                                               | (b)   | 10                                        | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| endrín aldehído                                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| heptacloro                                                  | µg/g     | 1.1                                                               | (b)   | 0.2                                       | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| heptacloro epóxido                                          | µg/g     | 0.53                                                              | (b)   | 7                                         | -                                      | -      | <0.001 | <0.001  | <0.001 | -       | -      | -      | -       | -      |
| metoxicloro                                                 | µg/g     | 62                                                                | (b)   | 280                                       | -                                      | -      | <0.01  | <0.01   | <0.01  | -       | -      | -      | -       | -      |
| toxafeno                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.3   | <0.3    | <0.3   | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del Terrenos Residenciales | Notas          | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |               |               |         |               |        |               |               |
|----------------------------------|----------------|--------------------------------------------------------------|----------------|-------------------------------------------|----------------------------------------|--------|--------|---------------|---------------|---------|---------------|--------|---------------|---------------|
|                                  |                |                                                              |                |                                           | W-7                                    |        |        |               |               | W-8     |               |        |               |               |
|                                  |                |                                                              |                |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08       | Nov-08        | Sept-07 | Oct-07        | Nov-07 | Sept-08       | Nov-08        |
| Parámetros Convencionales        |                |                                                              |                |                                           |                                        |        |        |               |               |         |               |        |               |               |
| pH                               | unidades de pH | -                                                            |                | -                                         | -                                      | -      | -      | 6.5           | 6.2           | -       | 5.7           | -      | 6.3           | 6             |
| cianuro total                    | µg/g           | <u>29</u>                                                    | i              | 40                                        | -                                      | -      | -      | -             | -             | -       | -             | -      | -             | -             |
| humedad                          | %              | -                                                            |                | -                                         | -                                      | -      | -      | -             | -             | -       | -             | -      | -             | -             |
| Metilmercurio                    |                |                                                              |                |                                           |                                        |        |        |               |               |         |               |        |               |               |
| metilmercurio                    |                |                                                              |                |                                           |                                        |        |        | -             | -             |         |               |        | -             | -             |
| Metales Solubles en Ácido Fuerte |                |                                                              |                |                                           |                                        |        |        |               |               |         |               |        |               |               |
| aluminio                         | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 20,200        | 17,300        | -       | 22,900        | -      | 16,900        | 14,900        |
| antimonio                        | µg/g           | <u>20</u>                                                    | n              | -                                         | -                                      | -      | -      | <0.1          | <0.1          | -       | <10           | -      | <0.1          | <0.1          |
| arsénico                         | µg/g           | <u>12</u>                                                    | i              | 20                                        | -                                      | -      | -      | 2.9           | 3.3           | -       | <10           | -      | 2.6           | 2.6           |
| bario                            | µg/g           | <u>500</u>                                                   | n              | 100                                       | -                                      | -      | -      | 89            | 112           | -       | 77            | -      | 99            | 74            |
| berilio                          | µg/g           | <u>4</u>                                                     | n              | -                                         | -                                      | -      | -      | <1            | <1            | -       | <1            | -      | <1            | <1            |
| boro                             | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | <1            | <1            | -       | <1            | -      | <1            | <1            |
| cadmio                           | µg/g           | <u>14</u>                                                    | i              | 5                                         | -                                      | -      | -      | <0.2          | <0.2          | -       | <0.5          | -      | <0.2          | <0.2          |
| calcio                           | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 1,680         | 1,590         | -       | 2,330         | -      | 1,110         | 882           |
| cromo                            | µg/g           | <u>220</u>                                                   | i              | 100                                       | -                                      | -      | -      | 20            | 19            | -       | 18            | -      | 16            | 17            |
| cobalto                          | µg/g           | <u>50</u>                                                    | n              | -                                         | -                                      | -      | -      | 15            | 15            | -       | 21            | -      | 23            | 15            |
| cobre                            | µg/g           | <u>1,100</u>                                                 | i              | -                                         | -                                      | -      | -      | 60            | 60            | -       | 65            | -      | 75            | 56            |
| hierro                           | µg/g           | <u>11,000</u>                                                | <sup>(b)</sup> | -N/A                                      | -                                      | -      | -      | <u>54,200</u> | <u>48,700</u> | -       | <u>46,300</u> | -      | <u>62,300</u> | <u>38,600</u> |
| plomo                            | µg/g           | <u>140</u>                                                   | i              | -                                         | -                                      | -      | -      | 4.5           | 5.2           | -       | 11            | -      | 8.7           | 7             |
| magnesio                         | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 7,320         | 5,830         | -       | 6,140         | -      | 3,190         | 2,200         |
| manganeso                        | µg/g           | <u>360</u>                                                   | <sup>(b)</sup> | -                                         | -                                      | -      | -      | <u>489</u>    | <u>534</u>    | -       | <u>984</u>    | -      | <u>1,090</u>  | <u>780</u>    |
| mercurio                         | µg/g           | <u>6.6</u>                                                   | i              | 14                                        | -                                      | -      | -      | 0.01          | 0.02          | -       | 0.02          | -      | 0.01          | 0.01          |
| molibdeno                        | µg/g           | <u>10</u>                                                    | n              | -                                         | -                                      | -      | -      | 1.3           | 1.5           | -       | <4            | -      | 1.8           | 1.7           |
| níquel                           | µg/g           | 320                                                          | <sup>(b)</sup> | 40                                        | -                                      | -      | -      | 7             | 6             | -       | 6             | -      | 5             | 5             |
| fósforo                          | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 432           | 374           | -       | 425           | -      | 381           | 308           |
| potasio                          | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 315           | 311           | -       | 329           | -      | 492           | 357           |
| selenio                          | µg/g           | <u>80</u>                                                    | d              | 63                                        | -                                      | -      | -      | 0.7           | 1             | -       | <2            | -      | 0.2           | 0.6           |
| plata                            | µg/g           | 20                                                           | n              | -                                         | -                                      | -      | -      | <0.1          | <0.1          | -       | <2            | -      | <0.1          | 0.1           |
| sodio                            | µg/g           | -                                                            |                | -                                         | -                                      | -      | -      | 74            | 61            | -       | 201           | -      | 34            | 41            |
| estroncio                        | µg/g           | <u>9,400</u>                                                 | <sup>(b)</sup> | -                                         | -                                      | -      | -      | 21            | 23            | -       | 23            | -      | 10            | 8             |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |            |        |         |            |        |            |        |
|-------------------------------------------------------------|----------|--------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|------------|--------|---------|------------|--------|------------|--------|
|                                                             |          |                                                              |       |                                           | W-7                                    |        |        |            |        | W-8     |            |        |            |        |
|                                                             |          |                                                              |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08    | Nov-08 | Sept-07 | Oct-07     | Nov-07 | Sept-08    | Nov-08 |
| talio                                                       | µg/g     | <u>1</u>                                                     | p     | -                                         | -                                      | -      | -      | <0.1       | <0.1   | -       | -          | -      | <0.1       | <0.1   |
| estaño                                                      | µg/g     | <u>50</u>                                                    | n     | -                                         | -                                      | -      | -      | <5         | <5     | -       | <5         | -      | <5         | <5     |
| titanio                                                     | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | 319        | 252    | -       | 155        | -      | 166        | 103    |
| vanadio                                                     | µg/g     | <u>110</u>                                                   | (b)   | -                                         | -                                      | -      | -      | <u>111</u> | 94     | -       | <u>152</u> | -      | <u>114</u> | 104    |
| zinc                                                        | µg/g     | <u>4,600</u>                                                 | (b)   | 30                                        | -                                      | -      | -      | 61         | 63     | -       | 68         | -      | 59         | 47     |
| zirconio                                                    | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | 3          | 4      |         | 7          |        | 5          | 3      |
| Herbicidas Ácidos Clorados                                  |          |                                                              |       |                                           |                                        |        |        |            |        |         |            |        |            |        |
| 2,4-D                                                       | µg/g     | <u>138</u>                                                   | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| 2,4-DB                                                      | µg/g     | <u>98</u>                                                    | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| 2,4,5-T                                                     | µg/g     | <u>122</u>                                                   | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| 2,4,5-TP                                                    | µg/g     | <u>98</u>                                                    | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| dicamba                                                     | µg/g     | <u>360</u>                                                   | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| MCPA                                                        | µg/g     | <u>6.2</u>                                                   | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| MCPP                                                        | µg/g     | <u>12.2</u>                                                  | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| piclorán                                                    | µg/g     | <u>860</u>                                                   | (b)   | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                              |       |                                           |                                        |        |        |            |        |         |            |        |            |        |
| benceno                                                     | µg/g     | 11                                                           | i     | 10                                        | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| etilbenceno                                                 | µg/g     | 10,000                                                       | i     | 20                                        | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| tolueno                                                     | µg/g     | 22,000                                                       | i     | 300                                       | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| xilenos                                                     | µg/g     | 150,000                                                      | i     | 100                                       | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| estireno                                                    | µg/g     | 5                                                            | n     | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                              |       |                                           |                                        |        |        |            |        |         |            |        |            |        |
| hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| Pesticidas Organoclorados                                   |          |                                                              |       |                                           |                                        |        |        |            |        |         |            |        |            |        |
| aldrín                                                      | µg/g     | <u>0.29</u>                                                  | (b)   | 4                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| alfa-BHC                                                    | µg/g     | <u>0.77</u>                                                  | (b)   | 7                                         | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| beta-BHC                                                    | µg/g     | <u>2.7</u>                                                   | (b)   | 10                                        | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| delta-BHC                                                   | µg/g     | -                                                            |       | 0.5                                       | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| gamma-BHC (lindano)                                         | µg/g     | <u>5.2</u>                                                   | (b)   | 10                                        | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |
| alpha-clordano                                              | µg/g     | <u>16</u>                                                    | (b)   | 10                                        | -                                      | -      | -      | -          | -      | -       | -          | -      | -          | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|--------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                              |       |                                           | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                       |          |                                                              |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-clordano        | µg/g     | <u>16</u>                                                    | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                    | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                    | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                    | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                    | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                    | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                    | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín              | µg/g     | <u>0.3</u>                                                   | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán I          | µg/g     | <u>74</u>                                                    | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán II         | µg/g     | <u>74</u>                                                    | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| sulfato de endosulfán | µg/g     | -                                                            |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrín                | µg/g     | <u>3.6</u>                                                   | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrín aldehído       | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro            | µg/g     | <u>1.1</u>                                                   | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro epóxido    | µg/g     | <u>0.53</u>                                                  | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro           | µg/g     | <u>62</u>                                                    | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno              | µg/g     | -                                                            |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |               |        |               |               |         |               |        |               |        |
|----------------------------------|----------------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|---------------|--------|---------------|---------------|---------|---------------|--------|---------------|--------|
|                                  |                |                                                                   |       |                                           | W-9                                    |               |        |               |               | W-10    |               |        |               |        |
|                                  |                |                                                                   |       |                                           | Sept-07                                | Oct-07        | Nov-07 | Sept-08       | Nov-08        | Sept-07 | Oct-07        | Nov-07 | Sept-08       | Nov-08 |
| Parámetros Convencionales        |                |                                                                   |       |                                           |                                        |               |        |               |               |         |               |        |               |        |
| pH                               | Unidades de pH | -                                                                 |       | -                                         | -                                      | 6.1           | -      | 6.7           | 6.5           | -       | 6             | -      | 6             | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                         | i     | 40                                        | -                                      | -             | -      | -             | -             | -       | -             | -      | -             | -      |
| Humedad                          | %              | -                                                                 |       | -                                         | -                                      | -             | -      | -             | -             | -       | -             | -      | -             | -      |
| Metilmercurio                    |                |                                                                   |       |                                           |                                        |               |        |               |               |         |               |        |               |        |
| Metilmercurio                    |                |                                                                   |       |                                           |                                        |               |        | -             | -             |         |               |        | -             | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                   |       |                                           |                                        |               |        |               |               |         |               |        |               |        |
| Aluminio                         | µg/g           | -                                                                 |       | -                                         | -                                      | 12,350        | -      | 5,550         | 7,530         | -       | 16,200        | -      | 16,600        | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                         | n     | -                                         | -                                      | <0.1          | -      | <0.1          | <0.1          | -       | <10           | -      | <0.1          | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                         | i     | 20                                        | -                                      | 0.45          | -      | 0.2           | 0.4           | -       | <10           | -      | 1.5           | -      |
| Bario                            | µg/g           | <u>500</u>                                                        | n     | 100                                       | -                                      | 99            | -      | 30            | 56            | -       | 67            | -      | 56            | -      |
| Berilio                          | µg/g           | <u>4</u>                                                          | n     | -                                         | -                                      | <1            | -      | <1            | <1            | -       | <1            | -      | <1            | -      |
| Boro                             | µg/g           | -                                                                 |       | -                                         | -                                      | <1            | -      | <1            | <1            | -       | <1            | -      | <1            | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                         | i     | 5                                         | -                                      | 0.45          | -      | 0.2           | 0.2           | -       | <0.5          | -      | 0.2           | -      |
| Calcio                           | µg/g           | -                                                                 |       | -                                         | -                                      | 801.5         | -      | 416           | 548           | -       | 598           | -      | 456           | -      |
| Cromo                            | µg/g           | <u>220</u>                                                        | i     | 100                                       | -                                      | 20            | -      | 18            | 18            | -       | 22            | -      | 21            | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                         | n     | -                                         | -                                      | 18.5          | -      | 5             | 10            | -       | 11            | -      | 9             | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                      | i     | -                                         | -                                      | 203           | -      | 54            | 117           | -       | 106           | -      | 117           | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                     | (b)   | -N/A                                      | -                                      | <u>24,800</u> | -      | <u>12,100</u> | <u>19,400</u> | -       | <u>31,500</u> | -      | <u>30,700</u> | -      |
| Plomo                            | µg/g           | <u>140</u>                                                        | i     | -                                         | -                                      | 13.05         | -      | 6             | 10            | -       | 12            | -      | 7.4           | -      |
| Magnesio                         | µg/g           | -                                                                 |       | -                                         | -                                      | 2,215         | -      | 1,390         | 1,640         | -       | 4,190         | -      | 4,350         | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                        | (b)   | -                                         | -                                      | <u>1,645</u>  | -      | <u>420</u>    | <u>752</u>    | -       | <u>703</u>    | -      | <u>425</u>    | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                        | i     | 14                                        | -                                      | 0.02          | -      | <0.01         | 0.01          | -       | <0.01         | -      | 0.01          | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                         | n     | -                                         | -                                      | 4.5           | -      | 1.3           | 4.8           | -       | 5             | -      | 4.1           | -      |
| Níquel                           | µg/g           | 320                                                               | (b)   | 40                                        | -                                      | 4.5           | -      | <2            | 3             | -       | 4             | -      | 4             | -      |
| Fósforo                          | µg/g           | -                                                                 |       | -                                         | -                                      | 251.5         | -      | 127           | 182           | -       | 316           | -      | 236           | -      |
| Potasio                          | µg/g           | -                                                                 |       | -                                         | -                                      | 195.5         | -      | 158           | 203           | -       | 304           | -      | 296           | -      |
| Selenio                          | µg/g           | <u>80</u>                                                         | d     | 63                                        | -                                      | 0.4           | -      | <0.2          | 0.3           | -       | <2            | -      | 0.3           | -      |
| Plata                            | µg/g           | 20                                                                | n     | -                                         | -                                      | 0.1           | -      | <0.1          | <0.1          | -       | <2            | -      | <0.1          | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Sodio                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | 27.5   | -      | <5      | 18     | -       | 35     | -      | 9       | -      |
| Estroncio                                                   | µg/g     | <u>9,400</u>                                                      | (b)   | -                                         | -                                      | 10     | -      | 6       | 10     | -       | 7      | -      | 5       | -      |
| Talio                                                       | µg/g     | <u>1</u>                                                          | p     | -                                         | -                                      | <0.1   | -      | <0.1    | <0.1   | -       | -      | -      | <0.1    | -      |
| Estaño                                                      | µg/g     | <u>50</u>                                                         | n     | -                                         | -                                      | <5     | -      | <5      | <5     | -       | <5     | -      | <5      | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | 117.5  | -      | 153     | 186    | -       | 155    | -      | 210     | -      |
| Vanadio                                                     | µg/g     | <u>110</u>                                                        | (b)   | -                                         | -                                      | 72.5   | -      | 41      | 63     | -       | 88     | -      | 96      | -      |
| Zinc                                                        | µg/g     | <u>4,600</u>                                                      | (b)   | 30                                        | -                                      | 151.5  | -      | 76      | 96     | -       | 110    | -      | 118     | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | <1     | -      | <1      | <1     | -       | 3      | -      | 1       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | <u>138</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | <u>98</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | <u>122</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | <u>98</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | <u>360</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | <u>6.2</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | <u>860</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | <u>0.29</u>                                                       | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | <u>0.77</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | <u>2.7</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-BHC (Lindano)   | µg/g     | <u>5.2</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |               |        |               |               |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|---------------|--------|---------------|---------------|
|                                  |                |                                                                      |       |                                              | W-11                                   |        |        |         |        | W-12    |               |        |               |               |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07        | Nov-07 | Sept-08       | Nov-08        |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |         |        |         |               |        |               |               |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 7.5           | -      | 5.7           | 6.4           |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -       | -      | -       | -             | -      | -             | -             |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -             | -      | -             | -             |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |         |        |         |               |        |               |               |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -       | -      |         |               |        | -             | -             |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |         |        |         |               |        |               |               |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 25,800        | -      | 8,890         | 8,680         |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | <10           | -      | <0.1          | <0.1          |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | -       | -      | -       | <10           | -      | 0.4           | 0.5           |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | -       | -      | -       | 93            | -      | 40            | 39            |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | <1            | -      | <1            | <1            |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | <1            | -      | <1            | <1            |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | -       | -      | -       | <0.5          | -      | <0.2          | <0.2          |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 1,490         | -      | 594           | 582           |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | -       | -      | -       | 34            | -      | 7             | 10            |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | 16            | -      | 6             | 5             |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | -       | -      | -       | 113           | -      | 45            | 43            |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | -       | -      | -       | <u>59,100</u> | -      | <u>36,000</u> | <u>17,400</u> |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | -       | -      | -       | 12            | -      | 3.1           | 1.8           |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 4,220         | -      | 1,490         | 1,360         |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | <u>590</u>    | -      | 208           | 203           |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | -       | -      | -       | <0.01         | -      | 0.01          | <0.01         |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | <4            | -      | 0.5           | 1             |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | -       | -      | -       | 5             | -      | 3             | 2             |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 637           | -      | 192           | 201           |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 482           | -      | 246           | 217           |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | -       | -      | -       | <2            | -      | <0.2          | 0.2           |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | -       | -      | -       | <2            | -      | <0.1          | <0.1          |
| Sodio                            | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | 171           | -      | 16            | 42            |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | 17     | -      | 9       | 9      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | <0.1    | <0.1   |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | -       | -      | -       | <5     | -      | <5      | <5     |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | 383    | -      | 361     | 279    |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | 293    | -      | 176     | 85     |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | -       | -      | -       | 77     | -      | 33      | 23     |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | 4      | -      | 1       | 1      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCP P                                                       | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas          | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |               |        |               |        |         |        |        |               |        |
|----------------------------------|----------------|----------------------------------------------------------------------|----------------|----------------------------------------------|----------------------------------------|---------------|--------|---------------|--------|---------|--------|--------|---------------|--------|
|                                  |                |                                                                      |                |                                              | W-13                                   |               |        |               |        | W-14    |        |        |               |        |
|                                  |                |                                                                      |                |                                              | Sept-07                                | Oct-07        | Nov-07 | Sept-08       | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08       | Nov-08 |
| Parámetros Convencionales        |                |                                                                      |                |                                              |                                        |               |        |               |        |         |        |        |               |        |
| pH                               | Unidades de pH | -                                                                    |                | -                                            | -                                      | 5.8           | -      | 5.8           | -      | -       | -      | -      | 6.4           | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i              | 40                                           | -                                      | -             | -      | -             | -      | -       | -      | -      | -             | -      |
| Humedad                          | %              | -                                                                    |                | -                                            | -                                      | -             | -      | -             | -      | -       | -      | -      | -             | -      |
| Metilmercurio                    |                |                                                                      |                |                                              |                                        |               |        |               |        |         |        |        |               |        |
| Metilmercurio                    |                |                                                                      |                |                                              |                                        |               |        | -             | -      |         |        |        | -             | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                      |                |                                              |                                        |               |        |               |        |         |        |        |               |        |
| Aluminio                         | µg/g           | -                                                                    |                | -                                            | -                                      | 6,430         | -      | 8,420         | -      | -       | -      | -      | 5,880         | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n              | -                                            | -                                      | <10           | -      | <0.1          | -      | -       | -      | -      | <0.1          | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i              | 20                                           | -                                      | <10           | -      | 0.2           | -      | -       | -      | -      | 0.2           | -      |
| Bario                            | µg/g           | <u>500</u>                                                           | n              | 100                                          | -                                      | 39            | -      | 46            | -      | -       | -      | -      | 26            | -      |
| Berilio                          | µg/g           | <u>4</u>                                                             | n              | -                                            | -                                      | <1            | -      | <1            | -      | -       | -      | -      | <1            | -      |
| Boro                             | µg/g           | -                                                                    |                | -                                            | -                                      | <1            | -      | <1            | -      | -       | -      | -      | <1            | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i              | 5                                            | -                                      | <0.5          | -      | <0.2          | -      | -       | -      | -      | <0.2          | -      |
| Calcio                           | µg/g           | -                                                                    |                | -                                            | -                                      | 618           | -      | 614           | -      | -       | -      | -      | 471           | -      |
| Cromo                            | µg/g           | <u>220</u>                                                           | i              | 100                                          | -                                      | 7             | -      | 4             | -      | -       | -      | -      | 8             | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n              | -                                            | -                                      | 4             | -      | 4             | -      | -       | -      | -      | 5             | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i              | -                                            | -                                      | 29            | -      | 40            | -      | -       | -      | -      | 23            | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | <sup>(b)</sup> | -N/A                                         | -                                      | <u>15,300</u> | -      | <u>13,600</u> | -      | -       | -      | -      | <u>30,300</u> | -      |
| Plomo                            | µg/g           | <u>140</u>                                                           | i              | -                                            | -                                      | <5            | -      | 1.7           | -      | -       | -      | -      | 1.5           | -      |
| Magnesio                         | µg/g           | -                                                                    |                | -                                            | -                                      | 1,150         | -      | 1,370         | -      | -       | -      | -      | 845           | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                           | <sup>(b)</sup> | -                                            | -                                      | 148           | -      | 173           | -      | -       | -      | -      | 153           | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i              | 14                                           | -                                      | 0.01          | -      | <0.01         | -      | -       | -      | -      | <0.01         | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n              | -                                            | -                                      | <4            | -      | 0.6           | -      | -       | -      | -      | 0.4           | -      |
| Níquel                           | µg/g           | 320                                                                  | <sup>(b)</sup> | 40                                           | -                                      | <2            | -      | <2            | -      | -       | -      | -      | <2            | -      |
| Fósforo                          | µg/g           | -                                                                    |                | -                                            | -                                      | 145           | -      | 164           | -      | -       | -      | -      | 174           | -      |
| Potasio                          | µg/g           | -                                                                    |                | -                                            | -                                      | 214           | -      | 289           | -      | -       | -      | -      | 141           | -      |
| Selenio                          | µg/g           | <u>80</u>                                                            | d              | 63                                           | -                                      | <2            | -      | <0.2          | -      | -       | -      | -      | <0.2          | -      |
| Plata                            | µg/g           | 20                                                                   | n              | -                                            | -                                      | <2            | -      | <0.1          | -      | -       | -      | -      | <0.1          | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Sodio                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | 27     | -      | 11      | -      | -       | -      | -      | 11      | -      |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | 11     | -      | 14      | -      | -       | -      | -      | 13      | -      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | <0.1    | -      | -       | -      | -      | <0.1    | -      |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | <5     | -      | <5      | -      | -       | -      | -      | <5      | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | 261    | -      | 368     | -      | -       | -      | -      | 375     | -      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | 64     | -      | 56      | -      | -       | -      | -      | 148     | -      |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | 26     | -      | 26      | -      | -       | -      | -      | 24      | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | 2      | -      | 1       | -      | -       | -      | -      | 1       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-BHC (Lindano)   | µg/g     | <u>5.2</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrin              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

**Tabla 5**      **Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)**

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas          | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |               |        |               |               |         |        |        |               |        |
|----------------------------------|----------------|----------------------------------------------------------------------|----------------|----------------------------------------------|----------------------------------------|---------------|--------|---------------|---------------|---------|--------|--------|---------------|--------|
|                                  |                |                                                                      |                |                                              | W-15                                   |               |        |               |               | W-16    |        |        |               |        |
|                                  |                |                                                                      |                |                                              | Sept-07                                | Oct-07        | Nov-07 | Sept-08       | Nov-08        | Sept-07 | Oct-07 | Nov-07 | Sept-08       | Nov-08 |
| Parámetros Convencionales        |                |                                                                      |                |                                              |                                        |               |        |               |               |         |        |        |               |        |
| pH                               | Unidades de pH | -                                                                    |                | -                                            | -                                      | 7.1           | -      | 6.6           | 6.3           | -       | -      | -      | 6             | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i              | 40                                           | -                                      | -             | -      | -             | -             | -       | -      | -      | -             | -      |
| Humedad                          | %              | -                                                                    |                | -                                            | -                                      | -             | -      | -             | -             | -       | -      | -      | -             | -      |
| Metilmercurio                    |                |                                                                      |                |                                              |                                        |               |        |               |               |         |        |        |               |        |
| Metilmercurio                    |                |                                                                      |                |                                              |                                        |               |        | -             | -             |         |        |        | -             | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                      |                |                                              |                                        |               |        |               |               |         |        |        |               |        |
| Aluminio                         | µg/g           | -                                                                    |                | -                                            | -                                      | 20,500        | -      | 23,600        | 17,500        | -       | -      | -      | 35,800        | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n              | -                                            | -                                      | <10           | -      | <0.1          | <0.1          | -       | -      | -      | <0.1          | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i              | 20                                           | -                                      | <10           | -      | 2.3           | 2.6           | -       | -      | -      | 2.4           | -      |
| Bario                            | µg/g           | <u>500</u>                                                           | n              | 100                                          | -                                      | 138           | -      | 129           | 126           | -       | -      | -      | 178           | -      |
| Berilio                          | µg/g           | <u>4</u>                                                             | n              | -                                            | -                                      | <1            | -      | <1            | <1            | -       | -      | -      | <1            | -      |
| Boro                             | µg/g           | -                                                                    |                | -                                            | -                                      | <1            | -      | <1            | <1            | -       | -      | -      | <1            | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i              | 5                                            | -                                      | <0.5          | -      | <0.2          | <0.2          | -       | -      | -      | <0.2          | -      |
| Calcio                           | µg/g           | -                                                                    |                | -                                            | -                                      | 2,480         | -      | 2,200         | 2,050         | -       | -      | -      | 2,450         | -      |
| Cromo                            | µg/g           | <u>220</u>                                                           | i              | 100                                          | -                                      | 16            | -      | 19            | 26            | -       | -      | -      | 20            | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n              | -                                            | -                                      | 16            | -      | 19            | 16            | -       | -      | -      | 24            | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i              | -                                            | -                                      | 45            | -      | 65            | 57            | -       | -      | -      | 86            | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | <sup>(b)</sup> | -N/A                                         | -                                      | <u>32,600</u> | -      | <u>54,000</u> | <u>50,200</u> | -       | -      | -      | <u>57,900</u> | -      |
| Plomo                            | µg/g           | <u>140</u>                                                           | i              | -                                            | -                                      | 8             | -      | 4.8           | 5.5           | -       | -      | -      | 4.8           | -      |
| Magnesio                         | µg/g           | -                                                                    |                | -                                            | -                                      | 6,130         | -      | 6,560         | 5,210         | -       | -      | -      | 4,570         | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                           | <sup>(b)</sup> | -                                            | -                                      | <u>647</u>    | -      | <u>675</u>    | <u>625</u>    | -       | -      | -      | <u>757</u>    | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i              | 14                                           | -                                      | 0.01          | -      | 0.02          | 0.03          | -       | -      | -      | 0.04          | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n              | -                                            | -                                      | <4            | -      | 1.2           | 1.2           | -       | -      | -      | 0.8           | -      |
| Níquel                           | µg/g           | 320                                                                  | <sup>(b)</sup> | 40                                           | -                                      | 6             | -      | 8             | 8             | -       | -      | -      | 12            | -      |
| Fósforo                          | µg/g           | -                                                                    |                | -                                            | -                                      | 503           | -      | 472           | 378           | -       | -      | -      | 435           | -      |
| Potasio                          | µg/g           | -                                                                    |                | -                                            | -                                      | 328           | -      | 387           | 329           | -       | -      | -      | 400           | -      |
| Selenio                          | µg/g           | <u>80</u>                                                            | d              | 63                                           | -                                      | <2            | -      | 0.8           | 0.7           | -       | -      | -      | 0.8           | -      |
| Plata                            | µg/g           | 20                                                                   | n              | -                                            | -                                      | <2            | -      | <0.1          | <0.1          | -       | -      | -      | <0.1          | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Sodio                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | 133    | -      | 66      | 77     | -       | -      | -      | 676     | -      |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | 67     | -      | 27      | 28     | -       | -      | -      | 42      | -      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | <0.1    | -      |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | <5     | -      | <5      | <5     | -       | -      | -      | <5      | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | 287    | -      | 318     | 383    | -       | -      | -      | 326     | -      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | 87     | -      | 115     | 141    | -       | -      | -      | 118     | -      |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | 54     | -      | 65      | 67     | -       | -      | -      | 70      | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | 5      | -      | 3       | 4      | -       | -      | -      | 6       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-BHC (Lindano)   | µg/g     | <u>5.2</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrin              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas          | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |               |        |               |        |               |               |        |               |        |
|----------------------------------|----------------|-------------------------------------------------------------------|----------------|-------------------------------------------|----------------------------------------|---------------|--------|---------------|--------|---------------|---------------|--------|---------------|--------|
|                                  |                |                                                                   |                |                                           | W-17                                   |               |        |               |        | W-18          |               |        |               |        |
|                                  |                |                                                                   |                |                                           | Sept-07                                | Oct-07        | Nov-07 | Sept-08       | Nov-08 | Sept-07       | Oct-07        | Nov-07 | Sept-08       | Nov-08 |
| Parámetros Convencionales        |                |                                                                   |                |                                           |                                        |               |        |               |        |               |               |        |               |        |
| pH                               | Unidades de pH | -                                                                 |                | -                                         | 6.1                                    | 6.8           | -      | 6.8           | -      | 6.5           | 6.7           | -      | 6.9           | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                         | i              | 40                                        | -                                      | -             | -      | -             | -      | -             | -             | -      | -             | -      |
| Humedad                          | %              | -                                                                 |                | -                                         | -                                      | -             | -      | -             | -      | -             | -             | -      | -             | -      |
| Metilmercurio                    |                |                                                                   |                |                                           |                                        |               |        |               |        |               |               |        |               |        |
| Metilmercurio                    |                |                                                                   |                |                                           |                                        |               |        | -             | -      |               |               |        | -             | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                   |                |                                           |                                        |               |        |               |        |               |               |        |               |        |
| Aluminio                         | µg/g           | -                                                                 |                | -                                         | 10,100                                 | 11,000        | -      | 10,300        | -      | 17,500        | 16,300        | -      | 24,800        | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                         | n              | -                                         | <0.1                                   | <10           | -      | <0.1          | -      | <0.1          | <0.1          | -      | <0.1          | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                         | i              | 20                                        | 2                                      | <10           | -      | 1.1           | -      | 1.8           | 2.6           | -      | 2.9           | -      |
| Bario                            | µg/g           | <u>500</u>                                                        | n              | 100                                       | 101                                    | 69            | -      | 50            | -      | 129           | 170           | -      | 161           | -      |
| Berilio                          | µg/g           | <u>4</u>                                                          | n              | -                                         | <1                                     | <1            | -      | <1            | -      | <1            | <1            | -      | <1            | -      |
| Boro                             | µg/g           | -                                                                 |                | -                                         | 2                                      | <1            | -      | <1            | -      | <1            | <1            | -      | <1            | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                         | i              | 5                                         | <0.2                                   | <0.5          | -      | <0.2          | -      | 0.4           | 0.4           | -      | 0.7           | -      |
| Calcio                           | µg/g           | -                                                                 |                | -                                         | 466                                    | 384           | -      | 525           | -      | 797           | 672           | -      | 951           | -      |
| Cromo                            | µg/g           | <u>220</u>                                                        | i              | 100                                       | 14                                     | 20            | -      | 19            | -      | 21            | 13            | -      | 22            | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                         | n              | -                                         | 14                                     | 13            | -      | 8             | -      | 27            | 49            | -      | 31            | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                      | i              | -                                         | 264                                    | 296           | -      | 230           | -      | 116           | 110           | -      | 138           | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                     | <sup>(b)</sup> | -N/A                                      | <u>29,400</u>                          | <u>28,700</u> | -      | <u>20,800</u> | -      | <u>52,200</u> | <u>60,900</u> | -      | <u>77,000</u> | -      |
| Plomo                            | µg/g           | <u>140</u>                                                        | i              | -                                         | 7.8                                    | 9             | -      | 5.5           | -      | 70.8          | 46.4          | -      | 63.9          | -      |
| Magnesio                         | µg/g           | -                                                                 |                | -                                         | 1,570                                  | 2,070         | -      | 2,380         | -      | 4,340         | 3,080         | -      | 4,480         | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                        | <sup>(b)</sup> | -                                         | <u>648</u>                             | <u>641</u>    | -      | 358           | -      | <u>1,470</u>  | <u>2,290</u>  | -      | <u>2,070</u>  | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                        | i              | 14                                        | <0.01                                  | <0.01         | -      | <0.01         | -      | 0.01          | 0.01          | -      | 0.01          | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                         | n              | -                                         | <u>11.5</u>                            | <u>27</u>     | -      | 8.2           | -      | 1.4           | 1.6           | -      | 3.3           | -      |
| Níquel                           | µg/g           | 320                                                               | <sup>(b)</sup> | 40                                        | 4                                      | 4             | -      | 6             | -      | 6             | 6             | -      | 6             | -      |
| Fósforo                          | µg/g           | -                                                                 |                | -                                         | 316                                    | 240           | -      | 225           | -      | 396           | 418           | -      | 495           | -      |
| Potasio                          | µg/g           | -                                                                 |                | -                                         | 266                                    | 233           | -      | 299           | -      | 271           | 267           | -      | 328           | -      |
| Selenio                          | µg/g           | <u>80</u>                                                         | d              | 63                                        | 1.6                                    | <2            | -      | 0.8           | -      | 0.6           | 0.4           | -      | 0.4           | -      |
| Plata                            | µg/g           | 20                                                                | n              | -                                         | 0.1                                    | <2            | -      | <0.1          | -      | <0.1          | <0.1          | -      | <0.1          | -      |
| Sodio                            | µg/g           | -                                                                 |                | -                                         | 17                                     | 8             | -      | 29            | -      | 17            | 15            | -      | 6             | -      |



Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | 8                                      | 6      | -      | 7       | -      | 13      | 8      | -      | 13      | -      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | <0.1                                   | -      | -      | <0.1    | -      | <0.1    | <0.1   | -      | <0.1    | -      |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | <5                                     | <5     | -      | <5      | -      | <5      | <5     | -      | <5      | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | 57                                     | 63     | -      | 72      | -      | 345     | 155    | -      | 318     | -      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | 61                                     | 63     | -      | 52      | -      | 171     | 117    | -      | 151     | -      |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | 76                                     | 78     | -      | 78      | -      | 242     | 222    | -      | 252     | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | <1                                     | 2      | -      | <1      | -      | 4       | 5      | -      | 5       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPD                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrin                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |               |               |         |        |        |         |        |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------------|---------------|---------|--------|--------|---------|--------|
|                                  |                |                                                                      |       |                                              | W-19                                   |        |        |               |               | W-20    |        |        |         |        |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08       | Nov-08        | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |               |               |         |        |        |         |        |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | 6.7           | 7             | -       | -      | -      | -       | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -             | -             | -       | -      | -      | -       | -      |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -             | -             | -       | -      | -      | -       | -      |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |               |               |         |        |        |         |        |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -             | -             |         |        |        | -       | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |               |               |         |        |        |         |        |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 16,800        | 14,300        | -       | -      | -      | -       | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | <0.1          | <0.1          | -       | -      | -      | -       | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | 6             | 6.6           | -       | -      | -      | -       | -      |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | 95            | 91            | -       | -      | -      | -       | -      |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | <1            | <1            | -       | -      | -      | -       | -      |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | <1            | 4             | -       | -      | -      | -       | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | <0.2          | <0.2          | -       | -      | -      | -       | -      |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 1,550         | 1,660         | -       | -      | -      | -       | -      |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | 18            | 23            | -       | -      | -      | -       | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | 13            | 13            | -       | -      | -      | -       | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | 52            | 42            | -       | -      | -      | -       | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | <u>62,100</u> | <u>60,100</u> | -       | -      | -      | -       | -      |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | 4.7           | 5.5           | -       | -      | -      | -       | -      |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 5,990         | 4,720         | -       | -      | -      | -       | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | <u>442</u>    | <u>583</u>    | -       | -      | -      | -       | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | <0.01         | <0.01         | -       | -      | -      | -       | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | 1             | 0.9           | -       | -      | -      | -       | -      |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | 5             | 6             | -       | -      | -      | -       | -      |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 527           | 344           | -       | -      | -      | -       | -      |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 363           | 323           | -       | -      | -      | -       | -      |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | 1.1           | 1.3           | -       | -      | -      | -       | -      |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | <0.1          | <0.1          | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Sodio                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 61      | 53     | -       | -      | -      | -       | -      |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | 15      | 14     | -       | -      | -      | -       | -      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | -       | -      |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | <5      | <5     | -       | -      | -      | -       | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 195     | 348    | -       | -      | -      | -       | -      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | 83      | 104    | -       | -      | -      | -       | -      |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | 47      | 40     | -       | -      | -      | -       | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 2       | 3      | -       | -      | -      | -       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| gamma-BHC (Lindano)   | µg/g     | <u>5.2</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrin              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrin aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

**Tabla 5**      **Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)**

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                  |                |                                                                      |       |                                              | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | 6.9     | 6.6    | -       | -      | -      | -       | -      |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 9,510   | 16,800 | -       | -      | -      | -       | -      |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | -       | -      |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | 0.5     | 1      | -       | -      | -      | -       | -      |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | 36      | 121    | -       | -      | -      | -       | -      |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | <1      | <1     | -       | -      | -      | -       | -      |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | <1      | <1     | -       | -      | -      | -       | -      |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | <0.2    | 0.2    | -       | -      | -      | -       | -      |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 671     | 1,980  | -       | -      | -      | -       | -      |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | 191     | 310    | -       | -      | -      | -       | -      |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | 9       | 33     | -       | -      | -      | -       | -      |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | 66      | 153    | -       | -      | -      | -       | -      |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | 21,600  | 58,900 | -       | -      | -      | -       | -      |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | 2.3     | 11.6   | -       | -      | -      | -       | -      |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 2,660   | 3,520  | -       | -      | -      | -       | -      |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | 308     | 826    | -       | -      | -      | -       | -      |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | <0.01   | 0.02   | -       | -      | -      | -       | -      |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | 1.3     | 1.6    | -       | -      | -      | -       | -      |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | 15      | 52     | -       | -      | -      | -       | -      |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 268     | 307    | -       | -      | -      | -       | -      |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 121     | 158    | -       | -      | -      | -       | -      |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | <0.2    | 0.3    | -       | -      | -      | -       | -      |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | -       | -      |
| Sodio                            | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 22      | 48     | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | 6       | 18     | -       | -      | -      | -       | -      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | -       | -      |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | <5      | <5     | -       | -      | -      | -       | -      |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 250     | 407    | -       | -      | -      | -       | -      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | 114     | 167    | -       | -      | -      | -       | -      |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | 55      | 144    | -       | -      | -      | -       | -      |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 1       | 3      | -       | -      | -      | -       | -      |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |               |        |         |        |        |         |               |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------------|--------|---------|--------|--------|---------|---------------|
|                                  |                |                                                                      |       |                                              | W-23                                   |        |        |               |        | W-26    |        |        |         |               |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08       | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08        |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |               |        |         |        |        |         |               |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | 6.6           | 6.5    | -       | -      | -      | -       | 5.5           |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -             | -      | -       | -      | -      | -       | -             |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -             | -      | -       | -      | -      | -       | -             |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |               |        |         |        |        |         |               |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -             | -      |         |        |        | -       | -             |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |               |        |         |        |        |         |               |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 4,000         | 5,030  | -       | -      | -      | -       | 10,600        |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | <0.1          | <0.1   | -       | -      | -      | -       | <0.1          |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | 0.1           | 0.2    | -       | -      | -      | -       | 4.4           |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | 23            | 19     | -       | -      | -      | -       | 23            |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | <1            | <1     | -       | -      | -      | -       | <1            |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | <1            | <1     | -       | -      | -      | -       | <1            |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | <0.2          | <0.2   | -       | -      | -      | -       | <0.2          |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 393           | 333    | -       | -      | -      | -       | 221           |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | 4             | 2      | -       | -      | -      | -       | 20            |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | 4             | 2      | -       | -      | -      | -       | 7             |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | 26            | 23     | -       | -      | -      | -       | 157           |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | <u>28,000</u> | 9,370  | -       | -      | -      | -       | <u>80,800</u> |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | 1.2           | 1      | -       | -      | -      | -       | 9.7           |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 494           | 570    | -       | -      | -      | -       | 1,380         |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | 192           | 137    | -       | -      | -      | -       | <u>368</u>    |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | <0.01         | <0.01  | -       | -      | -      | -       | 0.04          |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | 0.5           | 0.6    | -       | -      | -      | -       | 5.3           |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | <2            | <2     | -       | -      | -      | -       | <2            |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 125           | 109    | -       | -      | -      | -       | 622           |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | 61            | 88     | -       | -      | -      | -       | 255           |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | <0.2          | <0.2   | -       | -      | -      | -       | 7.2           |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | <0.1          | <0.1   | -       | -      | -      | -       | <0.1          |
| Sodio                            | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | <5            | 15     | -       | -      | -      | -       | 13            |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | 5       | 5      | -       | -      | -      | -       | 3      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | <0.1    | <0.1   | -       | -      | -      | -       | <0.1   |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | <5      | <5     | -       | -      | -      | -       | <5     |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | 290     | 151    | -       | -      | -      | -       | 8      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | 111     | 34     | -       | -      | -      | -       | 110    |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | 23      | 13     | -       | -      | -      | -       | 33     |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | <1      | <1     | -       | -      | -      | -       | <1     |
| Herbicidas Ácidos Clorados                                  |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCP P                                                       | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |               |         |        |        |         |               |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|---------------|---------|--------|--------|---------|---------------|
|                                  |                |                                                                      |       |                                              | W-28                                   |        |        |         |               | W-29    |        |        |         |               |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08        | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08        |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |         |               |         |        |        |         |               |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 6.4           | -       | -      | -      | -       | 6             |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -       | -             | -       | -      | -      | -       | -             |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -             | -       | -      | -      | -       | -             |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |         |               |         |        |        |         |               |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -       | -             |         |        |        | -       | -             |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |         |               |         |        |        |         |               |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 54,800        | -       | -      | -      | -       | 9,370         |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | <0.1          | -       | -      | -      | -       | <0.1          |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | -       | 0.5           | -       | -      | -      | -       | 5.3           |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | -       | 429           | -       | -      | -      | -       | 26            |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | <1            | -       | -      | -      | -       | <1            |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 1             | -       | -      | -      | -       | <1            |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | -       | <0.2          | -       | -      | -      | -       | <0.2          |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 2,860         | -       | -      | -      | -       | 987           |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | -       | 37            | -       | -      | -      | -       | 6             |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | 30            | -       | -      | -      | -       | 4             |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | -       | 78            | -       | -      | -      | -       | 26            |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | -       | <u>78,800</u> | -       | -      | -      | -       | <u>24,800</u> |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | -       | 4.2           | -       | -      | -      | -       | 4.4           |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 3,140         | -       | -      | -      | -       | 1,150         |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | <u>1,200</u>  | -       | -      | -      | -       | 253           |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | -       | 0.06          | -       | -      | -      | -       | 0.03          |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | 0.4           | -       | -      | -      | -       | 2.1           |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | -       | 13            | -       | -      | -      | -       | <2            |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 634           | -       | -      | -      | -       | 294           |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 228           | -       | -      | -      | -       | 249           |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | -       | 0.6           | -       | -      | -      | -       | 0.6           |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | -       | <0.1          | -       | -      | -      | -       | <0.1          |
| Sodio                            | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 124           | -       | -      | -      | -       | 20            |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | 51     | -       | -      | -      | -       | 6      |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | -       | <0.1   | -       | -      | -      | -       | <0.1   |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | -       | <5     | -       | -      | -      | -       | <5     |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 1,650  | -       | -      | -      | -       | 3      |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | -       | 222    | -       | -      | -      | -       | 46     |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | -       | 92     | -       | -      | -      | -       | 55     |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 6      | -       | -      | -      | -       | <1     |
| Herbicidas Ácido Clorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPD                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------|----------------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                  |                |                                                                      |       |                                              | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                  |                |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales        |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| pH                               | Unidades de pH | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 6.7    | -       | -      | -      | -       | 6.9    |
| Cianuro total                    | µg/g           | <u>29</u>                                                            | i     | 40                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Humedad                          | %              | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                    |                |                                                                      |       |                                              |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Metales Solubles en Ácido Fuerte |                |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Aluminio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 14,700 | -       | -      | -      | -       | 14,900 |
| Antimonio                        | µg/g           | <u>20</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | <0.1   | -       | -      | -      | -       | <0.1   |
| Arsénico                         | µg/g           | <u>12</u>                                                            | i     | 20                                           | -                                      | -      | -      | -       | 2.3    | -       | -      | -      | -       | 2.8    |
| Bario                            | µg/g           | <u>500</u>                                                           | n     | 100                                          | -                                      | -      | -      | -       | 511    | -       | -      | -      | -       | 241    |
| Berilio                          | µg/g           | <u>4</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | <1     | -       | -      | -      | -       | <1     |
| Boro                             | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | <1     | -       | -      | -      | -       | 1      |
| Cadmio                           | µg/g           | <u>14</u>                                                            | i     | 5                                            | -                                      | -      | -      | -       | 0.4    | -       | -      | -      | -       | <0.2   |
| Calcio                           | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 752    | -       | -      | -      | -       | 2,930  |
| Cromo                            | µg/g           | <u>220</u>                                                           | i     | 100                                          | -                                      | -      | -      | -       | 123    | -       | -      | -      | -       | <2     |
| Cobalto                          | µg/g           | <u>50</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | 112    | -       | -      | -      | -       | 7      |
| Cobre                            | µg/g           | <u>1,100</u>                                                         | i     | -                                            | -                                      | -      | -      | -       | 115    | -       | -      | -      | -       | 22     |
| Hierro                           | µg/g           | <u>11,000</u>                                                        | (b)   | -N/A                                         | -                                      | -      | -      | -       | 45,800 | -       | -      | -      | -       | 28,200 |
| Plomo                            | µg/g           | <u>140</u>                                                           | i     | -                                            | -                                      | -      | -      | -       | 8.2    | -       | -      | -      | -       | 4.7    |
| Magnesio                         | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 2,680  | -       | -      | -      | -       | 2,110  |
| Manganeso                        | µg/g           | <u>360</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | 3,910  | -       | -      | -      | -       | 876    |
| Mercurio                         | µg/g           | <u>6.6</u>                                                           | i     | 14                                           | -                                      | -      | -      | -       | 0.02   | -       | -      | -      | -       | 0.02   |
| Molibdeno                        | µg/g           | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | 0.4    | -       | -      | -      | -       | 0.3    |
| Níquel                           | µg/g           | 320                                                                  | (b)   | 40                                           | -                                      | -      | -      | -       | 66     | -       | -      | -      | -       | <2     |
| Fósforo                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 230    | -       | -      | -      | -       | 221    |
| Potasio                          | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 100    | -       | -      | -      | -       | 490    |
| Selenio                          | µg/g           | <u>80</u>                                                            | d     | 63                                           | -                                      | -      | -      | -       | 0.2    | -       | -      | -      | -       | <0.2   |
| Plata                            | µg/g           | 20                                                                   | n     | -                                            | -                                      | -      | -      | -       | 0.1    | -       | -      | -      | -       | <0.1   |
| Sodio                            | µg/g           | -                                                                    |       | -                                            | -                                      | -      | -      | -       | 27     | -       | -      | -      | -       | 61     |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                             |          |                                                                   |       |                                           | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | 17     | -       | -      | -      | -       | 29     |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | -       | 0.2    | -       | -      | -      | -       | <0.1   |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | -       | <5     | -       | -      | -      | -       | <5     |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 377    | -       | -      | -      | -       | 27     |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | -       | 165    | -       | -      | -      | -       | 60     |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | -       | 137    | -       | -      | -      | -       | 65     |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 7      | -       | -      | -      | -       | <1     |
| Herbicidas Ácido Clorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCP P                                                       | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Hidrocarburos volátiles VHs6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                       |          |                                                                   |       |                                           | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

**Tabla 5**      **Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)**

| Parámetro                        | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |               | Estadísticas <sup>4</sup> |               |               |                   |                     |           |
|----------------------------------|----------------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|---------------|---------------------------|---------------|---------------|-------------------|---------------------|-----------|
|                                  |                |                                                                   |       |                                           | W-36                                   |        |        |         |               | Mínimo                    | Máximo        | Media         | Promedio          | Desviación estándar | Conteo    |
|                                  |                |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08        |                           |               |               |                   |                     |           |
| Parámetros Convencionales        |                |                                                                   |       |                                           |                                        |        |        |         |               |                           |               |               |                   |                     |           |
| pH                               | Unidades de pH | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 5.4           | 5.4                       | 7.9           | 6.4           | 6.1687449         | 0.4795701           | 57        |
| Cianuro total                    | µg/g           | <u>29</u>                                                         | i     | 40                                        | -                                      | -      | -      | -       | -             | <0.15                     | <0.15         | -             | -                 | -                   | 3         |
| Humedad                          | %              | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -             | 23.1                      | 47.9          | 27.65         | 29.95             | 8.1869234           | 8         |
| Metilmercurio                    |                |                                                                   |       |                                           |                                        |        |        |         |               |                           |               |               |                   |                     |           |
| Metilmercurio                    |                |                                                                   |       |                                           |                                        |        |        | -       | -             | -                         | -             | -             | -                 | -                   | 0         |
| Metales Solubles en Ácido Fuerte |                |                                                                   |       |                                           |                                        |        |        |         |               |                           |               |               |                   |                     |           |
| Aluminio                         | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 11,700        | 4,000                     | 54,800        | 14,900        | 16,095.789        | 8,895.3401          | 57        |
| Antimonio                        | µg/g           | <u>20</u>                                                         | n     | -                                         | -                                      | -      | -      | -       | <0.1          | <0.1                      | <10           | -             | -                 | -                   | <u>57</u> |
| Arsénico                         | µg/g           | <u>12</u>                                                         | i     | 20                                        | -                                      | -      | -      | -       | 1.1           | 0.1                       | 6.6           | 2.3           | 2.4991228         | 1.7901639           | <u>57</u> |
| Bario                            | µg/g           | <u>500</u>                                                        | n     | 100                                       | -                                      | -      | -      | -       | 79            | 19                        | <u>511</u>    | 76            | 93.736842         | 85.37094            | 57        |
| Berilio                          | µg/g           | <u>4</u>                                                          | n     | -                                         | -                                      | -      | -      | -       | <1            | <1                        | <1            | -             | -                 | -                   | <u>57</u> |
| Boro                             | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | <1            | 0.5                       | 4             | 0.5           | 0.6403509         | 0.5407863           | 57        |
| Cadmio                           | µg/g           | <u>14</u>                                                         | i     | 5                                         | -                                      | -      | -      | -       | <0.2          | 0.1                       | 0.7           | 0.1           | 0.1692982         | 0.1167852           | <u>57</u> |
| Calcio                           | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 920           | 221                       | 2,930         | 878           | 1,092.4474        | 715.54201           | 57        |
| Cromo                            | µg/g           | <u>220</u>                                                        | i     | 100                                       | -                                      | -      | -      | -       | 4             | 1                         | <u>310</u>    | 19            | 30.526316         | 49.021535           | 57        |
| Cobalto                          | µg/g           | <u>50</u>                                                         | n     | -                                         | -                                      | -      | -      | -       | 6             | 2                         | <u>112</u>    | 15            | 16.552632         | 15.66721            | <u>57</u> |
| Cobre                            | µg/g           | <u>1,100</u>                                                      | i     | -                                         | -                                      | -      | -      | -       | 19            | 19                        | 988           | 66            | 136.52632         | 183.29476           | 57        |
| Hierro                           | µg/g           | <u>11,000</u>                                                     | (b)   | -N/A                                      | -                                      | -      | -      | -       | <u>25,200</u> | 9,370                     | <u>80,800</u> | <u>45,100</u> | <u>41,387.719</u> | <u>18,932.543</u>   | 57        |
| Plomo                            | µg/g           | <u>140</u>                                                        | i     | -                                         | -                                      | -      | -      | -       | 3.3           | 1                         | 70.8          | 6.5           | 10.434211         | 13.240769           | 57        |
| Magnesio                         | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 488           | 488                       | 7,320         | 3,140         | 3,257             | 1,857.3066          | 57        |
| Manganeso                        | µg/g           | <u>360</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | 188           | 137                       | <u>3,910</u>  | <u>648</u>    | <u>732.54386</u>  | <u>606.5598</u>     | 57        |
| Mercurio                         | µg/g           | <u>6.6</u>                                                        | i     | 14                                        | -                                      | -      | -      | -       | 0.07          | 0.005                     | 0.07          | 0.01          | 0.0149123         | 0.0141891           | <u>57</u> |
| Molibdeno                        | µg/g           | <u>10</u>                                                         | n     | -                                         | -                                      | -      | -      | -       | 0.6           | 0.3                       | <u>37</u>     | 1.5           | 4.4508772         | 7.6688871           | <u>57</u> |
| Níquel                           | µg/g           | 320                                                               | (b)   | 40                                        | -                                      | -      | -      | -       | <2            | 1                         | 66            | 5             | 7.3947368         | 10.83675            | 57        |
| Fósforo                          | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 525           | 109                       | 653           | 316           | 338.65789         | 141.5681            | 57        |
| Potasio                          | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 387           | 57                        | 494           | 289           | 277.86842         | 106.48996           | 57        |
| Selenio                          | µg/g           | <u>80</u>                                                         | d     | 63                                        | -                                      | -      | -      | -       | 0.9           | 0.1                       | 7.2           | 0.6           | 0.7666667         | 0.9610882           | 57        |
| Plata                            | µg/g           | 20                                                                | n     | -                                         | -                                      | -      | -      | -       | <0.1          | 0.05                      | 1             | 0.05          | 0.2245614         | 0.3616829           | <u>57</u> |
| Sodio                            | µg/g           | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 28            | 2.5                       | 676           | 31            | 56.096491         | 94.795006           | 57        |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        | Estadísticas <sup>4</sup> |        |       |           |                     |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|-------|-----------|---------------------|--------|
|                                                             |          |                                                                   |       |                                           | W-36                                   |        |        |         |        | Mínimo                    | Máximo | Media | Promedio  | Desviación estándar | Conteo |
|                                                             |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 |                           |        |       |           |                     |        |
| Estroncio                                                   | µg/g     | 9,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | 11     | 3                         | 67     | 11    | 14.368421 | 11.679701           | 57     |
| Talio                                                       | µg/g     | 1                                                                 | p     | -                                         | -                                      | -      | -      | -       | <0.1   | 0.05                      | 0.2    | 0.05  | 0.0531915 | 0.0218797           | 47     |
| Estaño                                                      | µg/g     | 50                                                                | n     | -                                         | -                                      | -      | -      | -       | <5     | <5                        | <5     | -     | -         | -                   | 57     |
| Titanio                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | 9      | 3                         | 1,650  | 200   | 237.60526 | 222.05917           | 57     |
| Vanadio                                                     | µg/g     | 110                                                               | (b)   | -                                         | -                                      | -      | -      | -       | 42     | 34                        | 293    | 104   | 106.67544 | 48.827365           | 57     |
| Zinc                                                        | µg/g     | 4,600                                                             | (b)   | 30                                        | -                                      | -      | -      | -       | 42     | 13                        | 252    | 65    | 79.429825 | 52.605628           | 57     |
| Zirconio                                                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | <1     | 0.5                       | 7      | 2     | 2.622807  | 1.9209389           | 57     |
| Herbicidas Ácido Clorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |           |                     |        |
| 2,4-D                                                       | µg/g     | 138                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| 2,4-DB                                                      | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| 2,4,5-T                                                     | µg/g     | 122                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| 2,4,5-TP                                                    | µg/g     | 98                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| Dicamba                                                     | µg/g     | 360                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| MCPA                                                        | µg/g     | 6.2                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| MCPD                                                        | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -         | -                   | 8      |
| Piclorán                                                    | µg/g     | 860                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -         | -                   | 8      |
| Hidrocarburos Volátiles Monocíclicos Inyección Directa      |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |           |                     |        |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | -                                      | -      | -      | -       | -      | <0.005                    | <0.03  | -     | -         | -                   | 6      |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | -                                      | -      | -      | -       | -      | <0.018                    | <0.03  | -     | -         | -                   | 6      |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | -                                      | -      | -      | -       | -      | <0.02                     | <0.03  | -     | -         | -                   | 6      |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | -                                      | -      | -      | -       | -      | <0.02                     | <0.03  | -     | -         | -                   | 6      |
| Estireno                                                    | µg/g     | 5                                                                 | n     | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -         | -                   | 0      |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |           |                     |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -         | -                   | 0      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -         | -                   | 0      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |           |                     |        |
| Aldrin                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -         | -                   | 8      |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -         | -                   | 8      |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -         | -                   | 8      |
| delta-BHC                                                   | µg/g     | -                                                                 |       | 0.5                                       | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -         | -                   | 8      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        | Estadísticas <sup>4</sup> |        |       |          |                     |          |
|-----------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|-------|----------|---------------------|----------|
|                       |          |                                                                   |       |                                           | W-36                                   |        |        |         |        |                           |        |       |          |                     |          |
|                       |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Media | Promedio | Desviación estándar | Conteo   |
| gamma-BHC (Lindano)   | µg/g     | <u>5.2</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -        | -                   | <u>8</u> |
| alpha-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -        | -                   | 8        |
| gamma-Clordano        | µg/g     | <u>16</u>                                                         | (b)   | 10                                        | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -        | -                   | 8        |
| o,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | 8        |
| p,p-DDD               | µg/g     | <u>20</u>                                                         | (b)   | 300                                       | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -     | -        | -                   | 8        |
| o,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | 8        |
| p,p-DDE               | µg/g     | <u>14</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | 8        |
| o,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | 8        |
| p,p-DDT               | µg/g     | <u>17</u>                                                         | (b)   | 200                                       | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | 8        |
| Dieldrín              | µg/g     | <u>0.3</u>                                                        | (b)   | 4                                         | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -     | -        | -                   | <u>8</u> |
| Endosulfán I          | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | 8        |
| Endosulfán II         | µg/g     | <u>74</u>                                                         | (b)   | 47                                        | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | 8        |
| Sulfato de endosulfán | µg/g     | -                                                                 |       | 47                                        | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | 8        |
| Endrín                | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | <u>8</u> |
| Endrín aldehído       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | 8        |
| Heptacloro            | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -        | -                   | <u>8</u> |
| Heptacloro epóxido    | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -     | -        | -                   | <u>8</u> |
| Metoxicloro           | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -     | -        | -                   | 8        |
| Toxafeno              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -     | -        | -                   | 8        |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.05  | <0.05   | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.005 | <0.05   | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | <0.005 | <0.05   | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | <0.005 | <0.05   | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | <0.01  | <0.05   | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | 0.0375 | 0.2     | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.3   | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.07  | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.07  | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | <0.06  | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.09  | -       | -      | -       | -      | -      | -       | -      |
| Fentió                             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | <0.3   | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <5     | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <5     | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la salud humana del CCME<br>Terrenos Residenciales | Notas | Estándares de suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | <0.03   | <0.03  |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | <0.03   | <0.03  |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | <0.03   | <0.03  |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | <0.03   | <0.03  |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | <0.03   | <0.03  |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | <0.05   | <0.05  |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.05   | <0.05  |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.05   | <0.05  |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | <0.005 | <0.05   | <0.05  |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | <0.01  | <0.05   | <0.05  |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la salud humana del CCME Terrenos Residenciales | Notas | Estándares de suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | 0.375  | 0.2     | 0.2    |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.3   | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.4   | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.4   | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.4   | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.4   | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.08  | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.08  | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.02  | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.07  | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la salud humana del CCME<br>Terrenos Residenciales | Notas | Estándares de suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.07  | -       | -      |
| Clorpirifos                        | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |
| Demetón                            | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Diazinón                           | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | -       | -      |
| Dimetoato                          | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.08  | -       | -      |
| Disulfotón                         | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.04  | -       | -      |
| Etión                              | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.06  | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.09  | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Fonofos                            | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.3   | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.08  | -       | -      |
| Malatión                           | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.05  | -       | -      |
| Metil paratión                     | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.04  | -       | -      |
| Paratión                           | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.04  | -       | -      |
| Forato                             | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.04  | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Fosmet                             | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.1   | -       | -      |
| Terbufos                           | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.2   | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <0.03  | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <5     | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | <5     | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.03  | <0.03   | <0.03  | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | <0.03  | <0.03   | <0.03  | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.03  | <0.03   | <0.03  | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | <0.03  | <0.03   | <0.03  | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | <0.03  | <0.03   | <0.03  | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.05  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.005 | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | <0.005 | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | <0.005 | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | <0.01  | <0.05   | <0.05  | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | 0.375  | 0.2     | 0.2    | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.3   | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.4   | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | <0.02  | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | <0.07  | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.07  | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | <0.06  | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.09  | -       | -      | -       | -      | -      | -       | -      |
| Fentió                             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | <0.3   | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | <0.08  | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.05  | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | <0.04  | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | <0.1   | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | <0.2   | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <0.03  | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <5     | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | <5     | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                            | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                                   |       |                                           | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                      |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                            | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas de Carbamato</b>       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                             | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                     | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                            | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                          | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                              | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                               | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                             | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                               | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                             | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                           | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                           | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                          | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                           | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                            | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                             | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                           | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                         | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                            | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                                   |       |                                           | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                      |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                            | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas de Carbamato</b>       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                             | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                     | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                            | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                          | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                              | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                               | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                             | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                               | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                             | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                           | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                           | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                          | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                           | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                            | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                             | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                           | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                         | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentió                             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentió                             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                            | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                                   |       |                                           | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                      |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                            | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas de Carbamato</b>       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                             | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                     | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                            | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                          | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                              | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                               | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                             | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                               | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                             | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                           | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                           | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                          | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                           | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                            | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                             | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                           | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                         | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                            | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                                   |       |                                           | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                      |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                            | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas de Carbamato</b>       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                             | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                     | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                            | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                          | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                              | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                               | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                             | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                               | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                             | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                           | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                           | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                          | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                           | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                            | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                             | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                           | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                         | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                            | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                                   |       |                                           | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                      |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                            | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas de Carbamato</b>       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                             | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                     | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                            | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                          | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                              | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                               | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                             | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                               | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                             | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                           | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                           | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                           | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                          | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                           | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                            | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                             | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                           | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                          | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                         | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

**Tabla 5**      **Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)**

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                   |       |                                           | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                                                                  |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                        | (b)   | 8                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                        | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                 |       | 470                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                 |       | 500                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                          | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                 |       | 200                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                         | n     | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                 |       | 900                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                 |       | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                 |       | 10                                        | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                 |       | 230                                       | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW)         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| totales                       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                 | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |          |                                                                      |       |                                              | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                           |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Trifluralina                              | µg/g     | <u>630</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organofosforados</b>        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                              | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                               | µg/g     | <u>36</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                                   | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                                  | µg/g     | <u>11</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                                 | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                                | µg/g     | <u>0.48</u>                                                          | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                                     | µg/g     | <u>6.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                               | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                                   | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                                   | µg/g     | <u>24</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                                 | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                                  | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                                | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                            | µg/g     | <u>3</u>                                                             | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                                  | µg/g     | <u>74</u>                                                            | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                                    | µg/g     | <u>2.4</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                                  | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                                    | µg/g     | <u>240</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                                  | µg/g     | <u>0.3</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos de Petróleo del CCME</b> |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido                  | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)                    | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                                   |       |                                           | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| PAH totales                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                     | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                      | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona              | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                     | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                   | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                       | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                        | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                      | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                        | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                      | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                    | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                    | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                   | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                    | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                     | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                      | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                    | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                  | µg/g     | 630                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                          | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                    |          |                                                                      |       |                                              | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                    |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforados        |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                      | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                        | µg/g     | 36                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                            | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                           | µg/g     | 11                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                          | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                         | µg/g     | 0.48                                                                 | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                              | µg/g     | 6.2                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                        | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                            | µg/g     | 24                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                          | µg/g     |                                                                      |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                           | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                     | µg/g     | 3                                                                    | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                           | µg/g     | 74                                                                   | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                             | µg/g     | 2.4                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                             | µg/g     | 240                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                           | µg/g     | 0.3                                                                  | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo del CCME |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido           | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)             | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME<br>Terrenos Residenciales | Notas | Estándares de Suelos de Panamá<br>Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|----------------------------------------------------------------------|-------|----------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                      |       |                                              | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                                                                  |          |                                                                      |       |                                              | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Bifenilos Policlorados                                                           |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                           | (b)   | 0.3                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                           | (b)   | 8                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                      |       |                                              |                                        |        |        |         |        |         |        |        |         |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                           | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenaftileno                                                                     | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Quinoleína                                                                       | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acenafteno                                                                       | µg/g     | -                                                                    |       | 470                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoreno                                                                         | µg/g     | -                                                                    |       | 500                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                             | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Antraceno                                                                        | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Acridina                                                                         | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fluoranteno                                                                      | µg/g     | -                                                                    |       | 200                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                            | n     | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Criseno *                                                                        | µg/g     | -                                                                    |       | 900                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                    |       | -                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                    |       | 100                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                    |       | 10                                           | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                    |       | 230                                          | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                                  |          |                                                                   |       |                                           | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                                                                  |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| PAH totales                                                                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| B[a]P TPE                                                                        | µg/g     | 5.3                                                               |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas de Carbamato                                                          |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Aldicarb                                                                         | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aldicarb sulfona                                                                 | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Sulfóxido de aldicarb                                                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbarilo                                                                        | µg/g     | 1,220                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Carbofurano                                                                      | µg/g     | 62                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-Hidroxi carbofurano                                                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dioxacarbo                                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metiocarbo                                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metomil                                                                          | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Oxamil                                                                           | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Promecarb                                                                        | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propoxur                                                                         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados                                                    |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Atrazina                                                                         | µg/g     | 21                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Desetil atrazina                                                                 | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diuron                                                                           | µg/g     | 24                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bromacil                                                                         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Butilato                                                                         | µg/g     | 620                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorprofam                                                                       | µg/g     | 2,400                                                             | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hexazinona                                                                       | µg/g     | 400                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metalaclor                                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metribuzina                                                                      | µg/g     | 300                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Prometrina                                                                       | µg/g     | 48                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Propazina                                                                        | µg/g     | 240                                                               | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Simazina                                                                         | µg/g     | 40                                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbutrina                                                                       | µg/g     | 12.2                                                              | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5      Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                 | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |          |                                                                   |       |                                           | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                           |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Triadimefón                               | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Trifluralina                              | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organofosforados</b>        |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| Azinfosmetil                              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorfenvinfos                             | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Clorpirifos                               | µg/g     | <u>36</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Demetón                                   | µg/g     | <u>0.48</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Diazinón                                  | µg/g     | <u>11</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dimetoato                                 | µg/g     | <u>2.4</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Disulfotón                                | µg/g     | <u>0.48</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etión                                     | µg/g     | <u>6.2</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fenitrotión                               | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fentión                                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fonofos                                   | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Isofenfos                                 | µg/g     |                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Malatión                                  | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metidatión                                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metil paratión                            | µg/g     | <u>3</u>                                                          | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Paratión                                  | µg/g     | <u>74</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Forato                                    | µg/g     | <u>2.4</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosalona                                  | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Fosmet                                    | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Terbufos                                  | µg/g     | <u>0.3</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tetraclovinfos                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos de Petróleo del CCME</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregido                  | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        | Estadísticas <sup>4</sup> |        |       |          |                     |        |
|----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|-------|----------|---------------------|--------|
|                                                                                  |          |                                                                   |       |                                           | W-36                                   |        |        |         |        | Mínimo                    | Máximo | Media | Promedio | Desviación estándar | Conteo |
|                                                                                  |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 |                           |        |       |          |                     |        |
| Bifenilos Policlorados                                                           |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |        |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 8      |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 8      |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 8      |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 8      |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                        | (b)   | 8                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 8      |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |        |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                        | n     | -                                         | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| 2-Metilnaftaleno                                                                 | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 8      |
| Acenaftileno                                                                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -     | -        | -                   | 8      |
| Quinoleína                                                                       | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -        | -                   | 0      |
| Acenafteno                                                                       | µg/g     | -                                                                 |       | 470                                       | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -     | -        | -                   | 8      |
| Fluoreno                                                                         | µg/g     | -                                                                 |       | 500                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                          | n     | -                                         | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Antraceno                                                                        | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Acridina                                                                         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -        | -                   | 0      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -        | -                   | 0      |
| Fluoranteno                                                                      | µg/g     | -                                                                 |       | 200                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Pireno                                                                           | µg/g     | <u>10</u>                                                         | n     | -                                         | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Benzo(a)antraceno *                                                              | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Criseno *                                                                        | µg/g     | -                                                                 |       | 900                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Benzo(b)fluoranteno *                                                            | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Benzo(k)fluoranteno *                                                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Benzo(a)pireno *                                                                 | µg/g     | -                                                                 |       | 10                                        | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | -                                                                 |       | 100                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Dibenz(a,h)antraceno *                                                           | µg/g     | -                                                                 |       | 10                                        | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -     | -        | -                   | 8      |
| Benzo(g,h,i)perileno *                                                           | µg/g     | -                                                                 |       | 230                                       | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -     | -        | -                   | 8      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de alto peso molecular (HMW) totales | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -        | -                   | 0      |
| PAH totales                                                                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | -                         | -      | -     | -        | -                   | 0      |
| B[a]P TPE                                                                        | µg/g     | <u>5.3</u>                                                        |       | -                                         | -                                      | -      | -      | -       | -      | 0.2                       | 0.375  | -     | -        | -                   | 10     |

Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                     | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        | Estadísticas <sup>4</sup> |        |       |          |                     |        |
|-------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|-------|----------|---------------------|--------|
|                               |          |                                                                   |       |                                           | W-36                                   |        |        |         |        | Mínimo                    | Máximo | Media | Promedio | Desviación estándar | Conteo |
|                               |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 |                           |        |       |          |                     |        |
| Pesticidas de Carbamato       |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |        |
| Aldicarb                      | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -     | -        | -                   | 3      |
| Aldicarb sulfona              | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -     | -        | -                   | 3      |
| Sulfóxido de aldicarb         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -     | -        | -                   | 3      |
| Carbarilo                     | µg/g     | <u>1,220</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| Carbofurano                   | µg/g     | <u>62</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| 3-Hidroxi carbofurano         | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| Dioxacarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -     | -        | -                   | 3      |
| Metiocarbo                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3      |
| Metomil                       | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3      |
| Oxamil                        | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -     | -        | -                   | 3      |
| Promecarb                     | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| Propoxur                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| Pesticidas Organonitrogenados |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |        |
| Atrazina                      | µg/g     | <u>21</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Desetil atrazina              | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Diuron                        | µg/g     | <u>24</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3      |
| Bromacil                      | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3      |
| Butilato                      | µg/g     | <u>620</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Clorprofam                    | µg/g     | <u>2,400</u>                                                      | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3      |
| Hexazinona                    | µg/g     | <u>400</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -     | -        | -                   | 3      |
| Metalaclor                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -     | -        | -                   | 3      |
| Metribuzina                   | µg/g     | <u>300</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Prometrina                    | µg/g     | <u>48</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Propazina                     | µg/g     | <u>240</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -     | -        | -                   | 3      |
| Simazina                      | µg/g     | <u>40</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 3      |
| Terbutrina                    | µg/g     | <u>12.2</u>                                                       | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 3      |
| Triadimefón                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.07                     | <0.07  | -     | -        | -                   | 3      |
| Trifluralina                  | µg/g     | <u>630</u>                                                        | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3      |
| Pesticidas Organofosforados   |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |        |
| Azinfosmetil                  | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | 3      |
| Clorfenvinfos                 | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.07                     | <0.07  | -     | -        | -                   | 3      |
| Clorpirifos                   | µg/g     | <u>36</u>                                                         | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3      |



Tabla 5 Tabla de Análisis de Sedimentos de Agua Dulce para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetro                                 | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        | Estadísticas <sup>4</sup> |        |       |          |                     |                 |
|-------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|-------|----------|---------------------|-----------------|
|                                           |          |                                                                   |       |                                           | W-36                                   |        |        |         |        | Mínimo                    | Máximo | Media | Promedio | Desviación estándar | Conteo          |
|                                           |          |                                                                   |       |                                           | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 |                           |        |       |          |                     |                 |
| Demetón                                   | µg/g     | <b><u>0.48</u></b>                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | <b><u>3</u></b> |
| Diazinón                                  | µg/g     | <b><u>11</u></b>                                                  | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 3               |
| Dimetoato                                 | µg/g     | <b><u>2.4</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -     | -        | -                   | <b><u>3</u></b> |
| Disulfotón                                | µg/g     | <b><u>0.48</u></b>                                                | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -     | -        | -                   | <b><u>3</u></b> |
| Etión                                     | µg/g     | <b><u>6.2</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.06                     | <0.06  | -     | -        | -                   | 3               |
| Fenitrotión                               | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.09                     | <0.09  | -     | -        | -                   | 3               |
| Fentión                                   | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3               |
| Fonofos                                   | µg/g     | <b><u>24</u></b>                                                  | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -     | -        | -                   | 3               |
| Isofenfos                                 | µg/g     |                                                                   |       | -                                         | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -     | -        | -                   | <b><u>3</u></b> |
| Malatión                                  | µg/g     | <b><u>240</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3               |
| Metidatión                                | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -     | -        | -                   | 3               |
| Metil paratión                            | µg/g     | <b><u>3</u></b>                                                   | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -     | -        | -                   | <b><u>3</u></b> |
| Paratión                                  | µg/g     | <b><u>74</u></b>                                                  | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -     | -        | -                   | 3               |
| Forato                                    | µg/g     | <b><u>2.4</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -     | -        | -                   | <b><u>3</u></b> |
| Fosalona                                  | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3               |
| Fosmet                                    | µg/g     | <b><u>240</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -     | -        | -                   | 3               |
| Terbufos                                  | µg/g     | <b><u>0.3</u></b>                                                 | (b)   | -                                         | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -     | -        | -                   | <b><u>3</u></b> |
| Tetraclovinfos                            | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -     | -        | -                   | 3               |
| <b>Hidrocarburos de Petróleo del CCME</b> |          |                                                                   |       |                                           |                                        |        |        |         |        |                           |        |       |          |                     |                 |
| F1 (C6-C10) no corregido                  | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <5                        | <5     | -     | -        | -                   | 3               |
| F1 menos BTEX (C6-C10)                    | µg/g     | -                                                                 |       | -                                         | -                                      | -      | -      | -       | -      | <5                        | <5     | -     | -        | -                   | 3               |

<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)  
Los factores propios del área incluyen: i= ingestión de suelo; c = contacto con el suelo; n = provisional; d = contacto directo; p = provisional  
<sup>(b)</sup> Cuando no se contó con un estándar de CCME aplicable, se utilizó los Niveles de Análisis de Suelos Residenciales Regionales para Contaminantes Químicos en Sitios del Superfondo (Sept, 2008) del Laboratorio Nacional de Oakridge (se ajustó las lineamientos para que reflejen un ILCR de 10-5, un HQ de 0.2)  
\* B[a]P TPE – Equivalentes totales de potencia es la suma de la potencia cancerígena estimada relativa a B[a]P usando los siguientes factores de equivalencia de potencia: benz(a)antraceno = 0.1, benzo(a)pireno = 1; benzo(b)fluoranteno = 0.1; benzo(k)fluoranteno = 0.1; criseno = 0.01; benzo(g,h,i)perileno = 0.01; dibenz(a,h)antraceno = 1; indeno(1,2,3-c,d)pireno = 0.1. Cuando no se detectó un parámetro, se utilizó la mitad del límite de detección.  
< = Menor a la concentración mínima detectable

|            |                                                                                                                                                             |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>500</b> | en negrita y subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales |
| <b>500</b> | subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá                                              |
| <i>500</i> | en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME                                                              |

Nota: Todas las unidades están en miligramos por kilogramo (mg/kg) a menos que se indique de otro modo

Tabla 6      Tabla de Análisis de Sedimentos Marinos/Estuarinos

| Parámetro                                 | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Caimito           |               |               |               | Río Petaquilla |               |               |               |
|-------------------------------------------|----------------|-------------------------------------------------------------------|-------|-------------------------------------------|-----------------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|
|                                           |                |                                                                   |       |                                           | Estuario <sup>4</sup> |               | Marino        |               | Estuario       |               | Marino        |               |
|                                           |                |                                                                   |       |                                           | Ene-08                | 20-Jun-08     | Ene-08        | 20-Jun-08     | Ene-08         | 20-Jun-08     | Ene-08        | 20-Jun-08     |
| Parámetros Convencionales en SUELO        |                |                                                                   |       |                                           |                       |               |               |               |                |               |               |               |
| pH                                        | Unidades de pH |                                                                   |       |                                           | 8                     | 7.7           | 7.8           | 7.9           | 7.1            | 8.3           | 7.4           | 7.5           |
| Cianuro total                             | µg/g           | <u>29</u>                                                         | i     | 40                                        | <0.15                 | <0.15         | 0.32          | -             | -              | -             | -             | -             |
| Humedad                                   | %              |                                                                   |       |                                           | 18.2                  | 23            | 20.9          | -             | -              | -             | -             | -             |
| Metilmercurio                             |                |                                                                   |       |                                           |                       |               |               |               |                |               |               |               |
| Metilmercurio                             |                |                                                                   |       |                                           |                       |               |               |               |                |               |               |               |
| Metales Solubles en Ácido Fuerte en SUELO |                |                                                                   |       |                                           |                       |               |               |               |                |               |               |               |
| Aluminio (Al)                             | µg/g           |                                                                   |       |                                           | 6,140                 | 7,080         | 6,230         | 5,130         | 6,630          | 6,520         | 6,560         | 5,110         |
| Antimonio (Sb)                            | µg/g           | <u>20</u>                                                         | n     |                                           | <0.1                  | <10           | <0.1          | <10           | <0.1           | <10           | <0.1          | <10           |
| Arsénico (As)                             | µg/g           | <u>12</u>                                                         | i     | 20                                        | 10.1                  | <u>13</u>     | 9.5           | 11            | 8.6            | <u>14</u>     | 10.2          | <u>13</u>     |
| Bario (Ba)                                | µg/g           | <u>500</u>                                                        | n     | 100                                       | 5                     | 8             | 4             | 4             | 5              | 5             | 4             | 4             |
| Berilio (Be)                              | µg/g           | <u>4</u>                                                          | n     |                                           | <1                    | <1            | <1            | <1            | <1             | <1            | <1            | <1            |
| Boro (B)                                  | µg/g           |                                                                   |       |                                           | 3                     | <1            | 6             | <1            | 5              | <1            | 8             | <1            |
| Cadmio (Cd)                               | µg/g           | <u>14</u>                                                         | i     | 5                                         | <0.2                  | <0.5          | <0.2          | <0.5          | <0.2           | <0.5          | <0.2          | <0.5          |
| Calcio (Ca)                               | µg/g           |                                                                   |       |                                           | 8,360                 | 13,600        | 9,700         | 8,560         | 13,800         | 16,500        | 11,800        | 12,500        |
| Cromo (Cr)                                | µg/g           | <u>220</u>                                                        | i     | 100                                       | 7                     | 17            | 23            | 9             | 31             | 16            | 14            | 8             |
| Cobalto (Co)                              | µg/g           | <u>50</u>                                                         | n     |                                           | 6                     | 11            | 11            | 6             | 12             | 10            | 7             | 6             |
| Cobre (Cu)                                | µg/g           | <u>1,100</u>                                                      | i     |                                           | 8                     | 9             | 9             | 7             | 10             | 9             | 8             | 6             |
| Hierro (Fe)                               | µg/g           | <u>11,000</u>                                                     | (b)   |                                           | <u>11,000</u>         | <u>23,600</u> | <u>29,400</u> | <u>12,800</u> | <u>40,700</u>  | <u>23,500</u> | <u>18,200</u> | <u>11,300</u> |
| Plomo (Pb)                                | µg/g           | <u>140</u>                                                        | i     |                                           | 0.9                   | <5            | 1.7           | <5            | 2.1            | <5            | 1.2           | <5            |
| Magnesio (Mg)                             | µg/g           |                                                                   |       |                                           | 3,960                 | 6,230         | 5,900         | 3,780         | 6,160          | 5,940         | 5,590         | 4,440         |
| Manganeso (Mn)                            | µg/g           | <u>360</u>                                                        | (b)   |                                           | 191                   | <u>400</u>    | <u>362</u>    | 251           | <u>442</u>     | <u>444</u>    | 296           | 301           |
| Mercurio (Hg)                             | µg/g           | <u>6.6</u>                                                        | i     | 14                                        | 0.01                  | <0.01         | 0.01          | <0.01         | 0.01           | <0.01         | 0.01          | <0.01         |
| Molibdeno (Mo)                            | µg/g           | <u>10</u>                                                         | n     |                                           | 0.2                   | <4            | 0.3           | <4            | 0.2            | <4            | 0.2           | <4            |
| Níquel (Ni)                               | µg/g           | <u>320</u>                                                        | (b)   | 40                                        | 3                     | 6             | 8             | 3             | 8              | 6             | 5             | 4             |
| Fósforo (P)                               | µg/g           |                                                                   |       |                                           | 126                   | 149           | 119           | 120           | 127            | 120           | 117           | 101           |
| Potasio (K)                               | µg/g           |                                                                   |       |                                           | 211                   | 476           | 204           | 277           | 186            | 357           | 247           | 291           |
| Selenio (Se)                              | µg/g           | <u>80</u>                                                         | d     | 63                                        | <0.2                  | <2            | <0.2          | <2            | <0.2           | <2            | <0.2          | <2            |
| Plata (Ag)                                | µg/g           | <u>20</u>                                                         | n     |                                           | <0.1                  | <2            | <0.1          | <2            | <0.1           | <2            | <0.1          | <2            |
| Sodio (Na)                                | µg/g           |                                                                   |       |                                           | 417                   | 516           | 759           | 568           | 766            | 358           | 1,980         | 596           |
| Estroncio (Sr)                            | µg/g           | <u>9,400</u>                                                      | (b)   |                                           | 60                    | 100           | 69            | 65            | 84             | 107           | 75            | 80            |
| Talio (Tl)                                | µg/g           | <u>1</u>                                                          | p     |                                           | <0.1                  | -             | <0.1          | -             | <0.1           | -             | <0.1          | -             |
| Estaño (Sn)                               | µg/g           | <u>50</u>                                                         | n     |                                           | <5                    | <5            | <5            | <5            | <5             | <5            | <5            | <5            |
| Titanio (Ti)                              | µg/g           |                                                                   |       |                                           | 210                   | 474           | 724           | 216           | 1,010          | 523           | 447           | 204           |
| Vanadio (V)                               | µg/g           | <u>110</u>                                                        | (b)   |                                           | 27                    | 75            | <u>120</u>    | 33            | <u>181</u>     | 84            | 66            | 26            |
| Zinc (Zn)                                 | µg/g           | <u>4,600</u>                                                      | (b)   | 30                                        | 19                    | 39            | 43            | 22            | 46             | 37            | 28            | 23            |
| Zirconio (Zr)                             | µg/g           |                                                                   |       |                                           | 2                     | 3             | 3             | 3             | 2              | 4             | 2             | 3             |

Tabla 6 Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Caimito           |           |        |           | Río Petaquilla |           |        |           |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|-----------------------|-----------|--------|-----------|----------------|-----------|--------|-----------|
|                                                             |          |                                                                   |       |                                           | Estuario <sup>4</sup> |           | Marino |           | Estuario       |           | Marino |           |
|                                                             |          |                                                                   |       |                                           | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08         | 20-Jun-08 | Ene-08 | 20-Jun-08 |
| Herbicidas Ácido Clorados                                   |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| 2,4-D                                                       | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| 2,4-DB                                                      | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| 2,4,5-T                                                     | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| 2,4,5-TP                                                    | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| Dicamba                                                     | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| MCPA                                                        | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| MCPP                                                        | µg/g     |                                                                   |       |                                           | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| Piclorán                                                    | µg/g     |                                                                   |       |                                           | <0.1                  | -         | <0.1   | -         | -              | -         | -      | -         |
| Hidrocarburos Volátiles Monocíclicos Inyección Directa      |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| Benceno                                                     | µg/g     | 11                                                                | i     | 10                                        | <0.04                 | <0.03     | <0.04  | -         | -              | -         | -      | -         |
| Etilbenceno                                                 | µg/g     | 10,000                                                            | i     | 20                                        | <0.5                  | <0.03     | <0.5   | -         | -              | -         | -      | -         |
| Tolueno                                                     | µg/g     | 22,000                                                            | i     | 300                                       | <0.5                  | <0.03     | <0.5   | -         | -              | -         | -      | -         |
| Xilenos                                                     | µg/g     | 150,000                                                           | i     | 100                                       | <0.1                  | <0.03     | <0.1   | -         | -              | -         | -      | -         |
| Estireno                                                    | µg/g     | 5                                                                 | n     |                                           | <0.1                  | -         | <0.1   | -         | -              | -         | -      | -         |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| Hidrocarburos volátiles VHs6-10                             | µg/g     |                                                                   |       |                                           | <100                  | -         | <100   | -         | -              | -         | -      | -         |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     |                                                                   |       |                                           | <100                  | -         | <100   | -         | -              | -         | -      | -         |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| Aldrín                                                      | µg/g     | 0.29                                                              | (b)   | 4                                         | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| alfa-BHC                                                    | µg/g     | 0.77                                                              | (b)   | 7                                         | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| beta-BHC                                                    | µg/g     | 2.7                                                               | (b)   | 10                                        | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| delta-BHC                                                   | µg/g     |                                                                   |       | 0.5                                       | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| gamma-BHC (Lindano)                                         | µg/g     | 5.2                                                               | (b)   | 10                                        | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| alpha-Clordano                                              | µg/g     | 16                                                                | (b)   | 10                                        | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| gamma-Clordano                                              | µg/g     | 16                                                                | (b)   | 10                                        | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| o,p-DDD                                                     | µg/g     | 20                                                                | (b)   | 300                                       | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| p,p-DDD                                                     | µg/g     | 20                                                                | (b)   | 300                                       | <0.005                | -         | <0.005 | -         | -              | -         | -      | -         |
| o,p-DDE                                                     | µg/g     | 14                                                                | (b)   | 200                                       | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| p,p-DDE                                                     | µg/g     | 14                                                                | (b)   | 200                                       | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| o,p-DDT                                                     | µg/g     | 17                                                                | (b)   | 200                                       | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| p,p-DDT                                                     | µg/g     | 17                                                                | (b)   | 200                                       | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| Dieldrín                                                    | µg/g     | 0.3                                                               | (b)   | 4                                         | <0.003                | -         | <0.003 | -         | -              | -         | -      | -         |
| Endosulfán I                                                | µg/g     | 74                                                                | (b)   | 47                                        | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |
| Endosulfán II                                               | µg/g     | 74                                                                | (b)   | 47                                        | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |
| Sulfato de endosulfán                                       | µg/g     |                                                                   |       | 47                                        | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |

Tabla 6      Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Caimito           |           |        |           | Río Petaquilla |           |        |           |
|----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|-----------------------|-----------|--------|-----------|----------------|-----------|--------|-----------|
|                                                                                  |          |                                                                   |       |                                           | Estuario <sup>4</sup> |           | Marino |           | Estuario       |           | Marino |           |
|                                                                                  |          |                                                                   |       |                                           | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08         | 20-Jun-08 | Ene-08 | 20-Jun-08 |
| Endrín                                                                           | µg/g     | <u>3.6</u>                                                        | (b)   | 10                                        | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |
| Endrín aldehído                                                                  | µg/g     |                                                                   |       |                                           | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |
| Heptacloro                                                                       | µg/g     | <u>1.1</u>                                                        | (b)   | 0.2                                       | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| Heptacloro epóxido                                                               | µg/g     | <u>0.53</u>                                                       | (b)   | 7                                         | <0.001                | -         | <0.001 | -         | -              | -         | -      | -         |
| Metoxicloro                                                                      | µg/g     | <u>62</u>                                                         | (b)   | 280                                       | <0.01                 | -         | <0.01  | -         | -              | -         | -      | -         |
| Toxafeno                                                                         | µg/g     |                                                                   |       |                                           | <0.3                  | -         | <0.3   | -         | -              | -         | -      | -         |
| Bifenilos Policlorados                                                           |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| Arocloro 1242                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | <0.03                 | -         | <0.03  | -         | -              | -         | -      | -         |
| Arocloro 1248                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   |                                           | <0.03                 | -         | <0.03  | -         | -              | -         | -      | -         |
| Arocloro 1254                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | <0.03                 | -         | <0.03  | -         | -              | -         | -      | -         |
| Arocloro 1260                                                                    | µg/g     | <u>2.2</u>                                                        | (b)   | 0.3                                       | <0.03                 | -         | <0.03  | -         | -              | -         | -      | -         |
| PCB total                                                                        | µg/g     | <u>2.4</u>                                                        | (b)   | 8                                         | <0.03                 | -         | <0.03  | -         | -              | -         | -      | -         |
| Hidrocarburos Aromáticos Policíclicos                                            |          |                                                                   |       |                                           |                       |           |        |           |                |           |        |           |
| Naftaleno                                                                        | µg/g     | <u>0.6</u>                                                        | n     |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| 2-Metilnaftaleno                                                                 | µg/g     |                                                                   |       |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Acenaftileno                                                                     | µg/g     |                                                                   |       |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Quinoleína                                                                       | µg/g     |                                                                   |       |                                           | -                     | -         | -      | -         | -              | -         | -      | -         |
| Acenafteno                                                                       | µg/g     |                                                                   |       | 470                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Fluoreno                                                                         | µg/g     |                                                                   |       | 500                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Fenantreno                                                                       | µg/g     | <u>5</u>                                                          | n     |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Antraceno                                                                        | µg/g     |                                                                   |       | 100                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Acridina                                                                         | µg/g     |                                                                   |       |                                           | -                     | -         | -      | -         | -              | -         | -      | -         |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     |                                                                   |       |                                           | -                     | -         | -      | -         | -              | -         | -      | -         |
| Benzo(a)pireno *                                                                 | µg/g     |                                                                   |       | 200                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     | <u>10</u>                                                         | n     |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Dibenz(a,h)antraceno *                                                           | µg/g     |                                                                   |       | 100                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Benzo(g,h,i)perileno *                                                           | µg/g     |                                                                   |       | 900                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Benzo(a)pireno *                                                                 | µg/g     |                                                                   |       | 100                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     |                                                                   |       |                                           | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Dibenz(a,h)antraceno *                                                           | µg/g     |                                                                   |       | 10                                        | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Benzo(g,h,i)perileno *                                                           | µg/g     |                                                                   |       | 100                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Benzo(a)pireno *                                                                 | µg/g     |                                                                   |       | 10                                        | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| Indeno(1,2,3-cd)pireno *                                                         | µg/g     |                                                                   |       | 230                                       | <0.05                 | -         | <0.05  | -         | -              | -         | -      | -         |
| B[a]P TPE                                                                        | µg/g     | <u>5.3</u>                                                        |       |                                           | 0.2                   |           | 0.2    |           |                |           |        |           |

Tabla 6 Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                                 | Unidades       | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Cocle del Norte |               |               |               | Punta Rincón  |        |
|-------------------------------------------|----------------|-------------------------------------------------------------------|-------|-------------------------------------------|---------------------|---------------|---------------|---------------|---------------|--------|
|                                           |                |                                                                   |       |                                           | Estuario            |               | Marine        |               | S5            | S14    |
|                                           |                |                                                                   |       |                                           | Ene-08              | 20-Jun-08     | Ene-08        | 20-Jun-08     | Ene-08        | Ene-08 |
| Parámetros Convencionales en SUELO        |                |                                                                   |       |                                           |                     |               |               |               |               |        |
| pH                                        | Unidades de pH |                                                                   |       |                                           | 7.8                 | 7.4           | 8.2           | 7.2           | 8             | 7.9    |
| Cianuro total                             | µg/g           | <u>29</u>                                                         | i     | 40                                        | -                   | -             | -             | -             | -             | -      |
| Humedad                                   | %              |                                                                   |       |                                           | -                   | -             | -             | -             | -             | -      |
| Metilmercurio                             |                |                                                                   |       |                                           |                     |               |               |               |               |        |
| Metilmercurio                             |                |                                                                   |       |                                           |                     |               |               |               |               |        |
| Metales Solubles en Ácido Fuerte en SUELO |                |                                                                   |       |                                           |                     |               |               |               |               |        |
| Aluminio (Al)                             | µg/g           |                                                                   |       |                                           | 8,200               | 6,750         | 8,830         | 4,030         | 6,860         | 4,930  |
| Antimonio (Sb)                            | µg/g           | <u>20</u>                                                         | n     |                                           | <0.1                | <10           | <0.1          | <10           | <0.1          | <0.1   |
| Arsénico (As)                             | µg/g           | <u>12</u>                                                         | i     | 20                                        | 9                   | <10           | 10.9          | <10           | 9             | 8.7    |
| Bario (Ba)                                | µg/g           | <u>500</u>                                                        | n     | 100                                       | 8                   | 7             | 7             | 5             | 4             | 4      |
| Berilio (Be)                              | µg/g           | <u>4</u>                                                          | n     |                                           | <1                  | <1            | <1            | <1            | <1            | <1     |
| Boro (B)                                  | µg/g           |                                                                   |       |                                           | 5                   | <1            | 7             | <1            | 7             | 4      |
| Cadmio (Cd)                               | µg/g           | <u>14</u>                                                         | i     | 5                                         | <0.2                | <0.5          | <0.2          | <0.5          | <0.2          | <0.2   |
| Calcio (Ca)                               | µg/g           |                                                                   |       |                                           | 10,500              | 6,910         | 12,500        | 3,440         | 10,700        | 6,270  |
| Cromo (Cr)                                | µg/g           | <u>220</u>                                                        | i     | 100                                       | 22                  | 34            | 21            | 38            | 19            | 6      |
| Cobalto (Co)                              | µg/g           | <u>50</u>                                                         | n     |                                           | 14                  | 15            | 14            | 15            | 9             | 5      |
| Cobre (Cu)                                | µg/g           | <u>1,100</u>                                                      | i     |                                           | 10                  | 10            | 11            | 8             | 8             | 7      |
| Hierro (Fe)                               | µg/g           | <u>11,000</u>                                                     | (b)   |                                           | <u>27,000</u>       | <u>38,600</u> | <u>26,900</u> | <u>46,000</u> | <u>24,200</u> | 10,800 |
| Plomo (Pb)                                | µg/g           | <u>140</u>                                                        | i     |                                           | 1.4                 | <5            | 1.5           | 6             | 1.2           | 1      |
| Magnesio (Mg)                             | µg/g           |                                                                   |       |                                           | 7,060               | 5,460         | 8,320         | 3,010         | 5,630         | 3,520  |
| Manganeso (Mn)                            | µg/g           | <u>360</u>                                                        | (b)   |                                           | <u>397</u>          | <u>485</u>    | <u>442</u>    | <u>449</u>    | 313           | 176    |
| Mercurio (Hg)                             | µg/g           | <u>6.6</u>                                                        | i     | 14                                        | 0.01                | <0.01         | 0.01          | <0.01         | 0.01          | 0.01   |
| Molibdeno (Mo)                            | µg/g           | <u>10</u>                                                         | n     |                                           | 0.2                 | <4            | 0.2           | <4            | 0.2           | 0.2    |
| Níquel (Ni)                               | µg/g           | <u>320</u>                                                        | (b)   | 40                                        | 8                   | 9             | 9             | 8             | 6             | 3      |
| Fósforo (P)                               | µg/g           |                                                                   |       |                                           | 142                 | 139           | 153           | 96            | 114           | 117    |
| Potasio (K)                               | µg/g           |                                                                   |       |                                           | 229                 | 333           | 279           | 325           | 214           | 145    |
| Selenio (Se)                              | µg/g           | <u>80</u>                                                         | d     | 63                                        | 0.2                 | <2            | <0.2          | <2            | <0.2          | <0.2   |
| Plata (Ag)                                | µg/g           | <u>20</u>                                                         | n     |                                           | <0.1                | <2            | <0.1          | <2            | <0.1          | <0.1   |
| Sodio (Na)                                | µg/g           |                                                                   |       |                                           | 569                 | 339           | 854           | 985           | 1,430         | 724    |

Tabla 6 Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                                                   | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Cocle del Norte |            |        |            | Punta Rincón |        |
|-------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|---------------------|------------|--------|------------|--------------|--------|
|                                                             |          |                                                                   |       |                                           | Estuario            |            | Marine |            | S5           | S14    |
|                                                             |          |                                                                   |       |                                           | Ene-08              | 20-Jun-08  | Ene-08 | 20-Jun-08  | Ene-08       | Ene-08 |
| Estroncio (Sr)                                              | µg/g     | <u>9,400</u>                                                      | (b)   |                                           | 71                  | 42         | 96     | 21         | 71           | 41     |
| Talio (Tl)                                                  | µg/g     | <u>1</u>                                                          | p     |                                           | <0.1                | -          | <0.1   | -          | <0.1         | <0.1   |
| Estaño (Sn)                                                 | µg/g     | <u>50</u>                                                         | n     |                                           | <5                  | <5         | <5     | <5         | <5           | <5     |
| Titanio (Ti)                                                | µg/g     |                                                                   |       |                                           | 681                 | 1,320      | 612    | 2,020      | 616          | 278    |
| Vanadio (V)                                                 | µg/g     | <u>110</u>                                                        | (b)   |                                           | 100                 | <u>179</u> | 101    | <u>251</u> | 99           | 33     |
| Zinc (Zn)                                                   | µg/g     | <u>4,600</u>                                                      | (b)   | 30                                        | 44                  | 63         | 46     | 74         | 34           | 18     |
| Zirconio (Zr)                                               | µg/g     |                                                                   |       |                                           | 3                   | 6          | 3      | 5          | 2            | 2      |
| Herbicidas Ácido Clorados                                   |          |                                                                   |       |                                           |                     |            |        |            |              |        |
| 2,4-D                                                       | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| 2,4-DB                                                      | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| 2,4,5-T                                                     | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| 2,4,5-TP                                                    | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| Dicamba                                                     | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| MCPA                                                        | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| MCPP                                                        | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| Piclorán                                                    | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| Hidrocarburos Volátiles Monocíclicos Inyección Directa      |          |                                                                   |       |                                           |                     |            |        |            |              |        |
| Benceno                                                     | µg/g     | <u>11</u>                                                         | i     | 10                                        | -                   | -          | -      | -          | -            | -      |
| Etilbenceno                                                 | µg/g     | <u>10,000</u>                                                     | i     | 20                                        | -                   | -          | -      | -          | -            | -      |
| Tolueno                                                     | µg/g     | <u>22,000</u>                                                     | i     | 300                                       | -                   | -          | -      | -          | -            | -      |
| Xilenos                                                     | µg/g     | <u>150,000</u>                                                    | i     | 100                                       | -                   | -          | -      | -          | -            | -      |
| Estireno                                                    | µg/g     | <u>5</u>                                                          | n     |                                           | -                   | -          | -      | -          | -            | -      |
| Hidrocarburos Aromáticos Monocíclicos Extracción de Metanol |          |                                                                   |       |                                           |                     |            |        |            |              |        |
| Hidrocarburos volátiles VHS6-10                             | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| Hidrocarburos volátiles de petróleo (VPH)                   | µg/g     |                                                                   |       |                                           | -                   | -          | -      | -          | -            | -      |
| Pesticidas Organoclorados                                   |          |                                                                   |       |                                           |                     |            |        |            |              |        |
| Aldrín                                                      | µg/g     | <u>0.29</u>                                                       | (b)   | 4                                         | -                   | -          | -      | -          | -            | -      |
| alfa-BHC                                                    | µg/g     | <u>0.77</u>                                                       | (b)   | 7                                         | -                   | -          | -      | -          | -            | -      |
| beta-BHC                                                    | µg/g     | <u>2.7</u>                                                        | (b)   | 10                                        | -                   | -          | -      | -          | -            | -      |

Tabla 6 Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                             | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Cocle del Norte |           |        |           | Punta Rincón |        |
|---------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|---------------------|-----------|--------|-----------|--------------|--------|
|                                       |          |                                                                   |       |                                           | Estuario            |           | Marine |           | S5           | S14    |
|                                       |          |                                                                   |       |                                           | Ene-08              | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08 |
| delta-BHC                             | µg/g     |                                                                   |       | 0.5                                       | -                   | -         | -      | -         | -            | -      |
| gamma-BHC (Lindano)                   | µg/g     | 5.2                                                               | (b)   | 10                                        | -                   | -         | -      | -         | -            | -      |
| alpha-Clordano                        | µg/g     | 16                                                                | (b)   | 10                                        | -                   | -         | -      | -         | -            | -      |
| gamma-Clordano                        | µg/g     | 16                                                                | (b)   | 10                                        | -                   | -         | -      | -         | -            | -      |
| o,p-DDD                               | µg/g     | 20                                                                | (b)   | 300                                       | -                   | -         | -      | -         | -            | -      |
| p,p-DDD                               | µg/g     | 20                                                                | (b)   | 300                                       | -                   | -         | -      | -         | -            | -      |
| o,p-DDE                               | µg/g     | 14                                                                | (b)   | 200                                       | -                   | -         | -      | -         | -            | -      |
| p,p-DDE                               | µg/g     | 14                                                                | (b)   | 200                                       | -                   | -         | -      | -         | -            | -      |
| o,p-DDT                               | µg/g     | 17                                                                | (b)   | 200                                       | -                   | -         | -      | -         | -            | -      |
| p,p-DDT                               | µg/g     | 17                                                                | (b)   | 200                                       | -                   | -         | -      | -         | -            | -      |
| Dieldrín                              | µg/g     | 0.3                                                               | (b)   | 4                                         | -                   | -         | -      | -         | -            | -      |
| Endosulfán I                          | µg/g     | 74                                                                | (b)   | 47                                        | -                   | -         | -      | -         | -            | -      |
| Endosulfán II                         | µg/g     | 74                                                                | (b)   | 47                                        | -                   | -         | -      | -         | -            | -      |
| Sulfato de endosulfán                 | µg/g     |                                                                   |       | 47                                        | -                   | -         | -      | -         | -            | -      |
| Endrín                                | µg/g     | 3.6                                                               | (b)   | 10                                        | -                   | -         | -      | -         | -            | -      |
| Endrín aldehído                       | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Heptacloro                            | µg/g     | 1.1                                                               | (b)   | 0.2                                       | -                   | -         | -      | -         | -            | -      |
| Heptacloro epóxido                    | µg/g     | 0.53                                                              | (b)   | 7                                         | -                   | -         | -      | -         | -            | -      |
| Metoxicloro                           | µg/g     | 62                                                                | (b)   | 280                                       | -                   | -         | -      | -         | -            | -      |
| Toxafeno                              | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Bifenilos Policlorados                |          |                                                                   |       |                                           |                     |           |        |           |              |        |
| Arocloro 1242                         | µg/g     | 2.2                                                               | (b)   | 0.3                                       | -                   | -         | -      | -         | -            | -      |
| Arocloro 1248                         | µg/g     | 2.2                                                               | (b)   |                                           | -                   | -         | -      | -         | -            | -      |
| Arocloro 1254                         | µg/g     | 2.2                                                               | (b)   | 0.3                                       | -                   | -         | -      | -         | -            | -      |
| Arocloro 1260                         | µg/g     | 2.2                                                               | (b)   | 0.3                                       | -                   | -         | -      | -         | -            | -      |
| PCB total                             | µg/g     | 2.4                                                               | (b)   | 8                                         | -                   | -         | -      | -         | -            | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                                   |       |                                           |                     |           |        |           |              |        |
| Naftaleno                             | µg/g     | 0.6                                                               | n     |                                           | -                   | -         | -      | -         | -            | -      |
| 2-Metilnaftaleno                      | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Acenaftileno                          | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Quinoleína                            | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |



Tabla 6 Tabla de Análisis de Sedimentos Marinos/Estuarinos (continuación)

| Parámetro                                                                        | Unidades | Lineamientos para la Salud Humana del CCME Terrenos Residenciales | Notas | Estándares de Suelos de Panamá Uso Urbano | Río Cocle del Norte |           |        |           | Punta Rincón |        |
|----------------------------------------------------------------------------------|----------|-------------------------------------------------------------------|-------|-------------------------------------------|---------------------|-----------|--------|-----------|--------------|--------|
|                                                                                  |          |                                                                   |       |                                           | Estuario            |           | Marine |           | S5           | S14    |
|                                                                                  |          |                                                                   |       |                                           | Ene-08              | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08 |
| Acenafteno                                                                       | µg/g     |                                                                   |       | 470                                       | -                   | -         | -      | -         | -            | -      |
| Fluoreno                                                                         | µg/g     |                                                                   |       | 500                                       | -                   | -         | -      | -         | -            | -      |
| Fenantreno                                                                       | µg/g     | 5                                                                 | n     |                                           | -                   | -         | -      | -         | -            | -      |
| Antraceno                                                                        | µg/g     |                                                                   |       | 100                                       | -                   | -         | -      | -         | -            | -      |
| Acridina                                                                         | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Hidrocarburos Aromáticos Policíclicos (PAH) de bajo peso molecular (LMW) totales | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Fluoranteno                                                                      | µg/g     |                                                                   |       | 200                                       | -                   | -         | -      | -         | -            | -      |
| Pireno                                                                           | µg/g     | 10                                                                | n     |                                           | -                   | -         | -      | -         | -            | -      |
| Benzo(a)antraceno*                                                               | µg/g     |                                                                   |       | 100                                       | -                   | -         | -      | -         | -            | -      |
| Criseno*                                                                         | µg/g     |                                                                   |       | 900                                       | -                   | -         | -      | -         | -            | -      |
| Benzo(b)fluoranteno*                                                             | µg/g     |                                                                   |       | 100                                       | -                   | -         | -      | -         | -            | -      |
| Benzo(k)fluoranteno*                                                             | µg/g     |                                                                   |       |                                           | -                   | -         | -      | -         | -            | -      |
| Benzo(a)pireno*                                                                  | µg/g     |                                                                   |       | 10                                        | -                   | -         | -      | -         | -            | -      |
| Indeno(1,2,3-cd)pireno*                                                          | µg/g     |                                                                   |       | 100                                       | -                   | -         | -      | -         | -            | -      |
| Dibenz(a,h)antraceno*                                                            | µg/g     |                                                                   |       | 10                                        | -                   | -         | -      | -         | -            | -      |
| Benzo(g,h,i)perileno*                                                            | µg/g     |                                                                   |       | 230                                       | -                   | -         | -      | -         | -            | -      |
| B[a]P TPE                                                                        | µg/g     | 5.3                                                               |       |                                           |                     |           |        |           |              |        |

<sup>(a)</sup> Los estándares que se muestran pertenecen a las Lineamientos para la Salud Humana del Consejo Canadiense de Ministros del Ambiente (CCME) para terrenos residenciales (TR) y tierras agrícolas (TA)

Los factores propios del área incluyen: i= ingestión de suelo; c = contacto con el suelo; n = provisional; d = contacto directo; p = provisional

<sup>(b)</sup> Cuando no se contó con un estándar de CCME aplicable, se utilizó los Niveles de Análisis de Suelos Residenciales Regionales para Contaminantes Químicos en Sitios del Superfondo (Sept, 2008) del Laboratorio Nacional de Oakridge (se ajustó las lineamientos para que reflejen un ILCR de 10-5, un HQ de 0.2)

\* B[a]P TPE – Equivalentes totales de potencia es la suma de la potencia cancerígena estimada relativa a B[a]P usando los siguientes factores de equivalencia de potencia: benz(a)antraceno = 0.1, benzo(a)pireno = 1; benzo(b)fluoranteno = 0.1; benzo(k)fluoranteno = 0.1; criseno = 0.01; benzo(g,h,i)perileno = 0.01; dibenz(a,h)antraceno = 1; indeno(1,2,3-c,d)pireno = 0.1. Cuando no se detectó un parámetro, se utilizó la mitad del límite de detección.

< = Menor a la concentración mínima detectable

|     |                                                                                                                                                             |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 500 | en negrita y subrayado indica que las concentraciones son mayores que las lineamientos para la salud humana del CCME respecto de los terrenos residenciales |
| 500 | subrayado/en cursiva indica que las concentraciones son mayores que los estándares de suelos urbanos de Panamá                                              |
| 500 | en cursiva indica que el límite de detección del método es mayor que las lineamientos del CCME                                                              |

Nota: Todas las unidades están en miligramos por kilogramo (mg/kg) a menos que se indique de otro modo



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | 6.5    | 6      | 6.6     | -      | -       | 6.6    | -      | 5.8     | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | < 0.15 | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | 35.2   | 25.7    | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | 22,100 | 16,600 | 28,600  | -      | -       | 19,900 | -      | 23,500  | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | < 10   | < 0.1  | < 0.1   | -      | -       | < 10   | -      | < 0.1   | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | < 10   | 2.3    | 1.7     | -      | -       | < 10   | -      | 2       | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | 40     | 52     | 49      | -      | -       | 50     | -      | 80      | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | < 1    | < 1    | < 1     | -      | -       | < 1    | -      | < 1     | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | < 1    | < 1    | < 1     | -      | -       | < 1    | -      | < 1     | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | < 0.5  | 0.2    | < 0.2   | -      | -       | < 0.5  | -      | 0.2     | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | 571    | 391    | 454     | -      | -       | 742    | -      | 560     | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | 21     | 19     | 18      | -      | -       | 41     | -      | 27      | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | 17     | 20     | 17      | -      | -       | 12     | -      | 14      | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | 988    | 737    | 761     | -      | -       | 321    | -      | 325     | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | 45,100 | 58,600 | 59,800  | -      | -       | 49,100 | -      | 55,300  | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | 25     | 22.9   | 13.5    | -      | -       | 27     | -      | 14.6    | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | 5,560  | 3,240  | 5,360   | -      | -       | 5,500  | -      | 5,370   | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | 922    | 806    | 852     | -      | -       | 709    | -      | 556     | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | < 0.01 | 0.02   | < 0.01  | -      | -       | < 0.01 | -      | 0.01    | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | 37     | 18.4   | 34.8    | -      | -       | 11     | -      | 9.2     | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | 5      | 5      | 4       | -      | -       | 6      | -      | 6       | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | 575    | 326    | 465     | -      | -       | 520    | -      | 358     | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | 476    | 303    | 494     | -      | -       | 300    | -      | 334     | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | < 2    | 1.7    | 1.6     | -      | -       | < 2    | -      | 0.8     | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | < 2    | 0.2    | 0.1     | -      | -       | < 2    | -      | < 0.1   | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | 31     | 8      | 16      | -      | -       | 36     | -      | 12      | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | 6      | 7      | 6       | -      | -       | 9      | -      | 8       | -      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | < 0.1  | < 0.1   | -      | -       | -      | -      | < 0.1   | -      |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | < 5    | < 5    | < 5     | -      | -       | < 5    | -      | < 5     | -      |
| titanio (Ti)                              | µg/g        |                                                    | -                                      | 136    | 88     | 127     | -      | -       | 200    | -      | 208     | -      |
| vanadio (V)                               | µg/g        |                                                    | -                                      | 103    | 110    | 96      | -      | -       | 142    | -      | 126     | -      |
| zinc (Zn)                                 | µg/g        | 123                                                | -                                      | 117    | 105    | 100     | -      | -       | 188    | -      | 169     | -      |
| zirconio (Zr)                             | µg/g        |                                                    | -                                      | 4      | 2      | 1       | -      | -       | 4      | -      | 2       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-1                                    |        |         |         |        | W-2     |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| MCPD                                                      | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | < 0.1   | < 0.1   | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| Benceno                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.03  | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                               | µg/g     |                                                    | -                                      | -      | < 0.018 | < 0.03  | -      | -       | -      | -      | -       | -      |
| Tolueno                                                   | µg/g     |                                                    | -                                      | -      | < 0.02  | < 0.03  | -      | -       | -      | -      | -       | -      |
| Xilenos                                                   | µg/g     |                                                    | -                                      | -      | < 0.02  | < 0.03  | -      | -       | -      | -      | -       | -      |
| Estireno                                                  | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | < 0.005 | < 0.005 | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-1                                    |        |         |         |        | W-2     |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | < 0.003 | < 0.003 | -      | -       | -      | -      | -       | -      |
| endosulfán I                          | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| endosulfán II                         | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | < 0.001 | < 0.001 | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | < 0.3   | < 0.3   | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | -      | -       | -      | -      | -       | -      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | -      | -       | -      | -      | -       | -      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | -      | -       | -      | -      | -       | -      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | < 0.05  | < 0.05  | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | < 0.005 | < 0.05  | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | < 0.005 | < 0.05  | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| Total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                     | µg/g     | 0.0317                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| criseno                               | µg/g     | 0.0571                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                   | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                            | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |        |         |        |        |         |        |
|--------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|--------|---------|--------|--------|---------|--------|
|                                      |          |                                                    | W-1                                    |        |         |         |        | W-2     |        |        |         |        |
|                                      |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| benzo(k)fluoranteno                  | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                       | µg/g     | 0.0319                                             | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno               | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno                | µg/g     | 0.00622                                            | -                                      | -      | < 0.005 | < 0.05  | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno                 | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                        | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| total HAP                            | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Carbamatos</b>         |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| aldicarb                             | µg/g     |                                                    | -                                      | -      | < 0.3   | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona                     | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido                   | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                             | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                           | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán                  | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                            | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                            | µg/g     |                                                    | -                                      | -      | < 0.1   | -       | -      | -       | -      | -      | -       | -      |
| metomilo                             | µg/g     |                                                    | -                                      | -      | < 0.1   | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                               | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| promecarb                            | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| propoxur                             | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organonitrogenados</b> |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| atrazina                             | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil                     | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| diuron                               | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| bromacil                             | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| butilato                             | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                           | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                           | µg/g     |                                                    | -                                      | -      | < 0.08  | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                         | µg/g     |                                                    | -                                      | -      | < 0.08  | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                           | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| prometryn                            | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-1                                    |        |        |         |        | W-2     |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| propazina                             | µg/g     |                                                    | -                                      | -      | < 0.02 | -       | -      | -       | -      | -      | -       | -      |
| simazina                              | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                            | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                           | µg/g     |                                                    | -                                      | -      | < 0.07 | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                          | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organofosforado</b>     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                         | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                         | µg/g     |                                                    | -                                      | -      | < 0.07 | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                           | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| demeton                               | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| diazinón                              | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                             | µg/g     |                                                    | -                                      | -      | < 0.08 | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                            | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| etión                                 | µg/g     |                                                    | -                                      | -      | < 0.06 | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                           | µg/g     |                                                    | -                                      | -      | < 0.09 | -       | -      | -       | -      | -      | -       | -      |
| fentión                               | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| fonofos                               | µg/g     |                                                    | -                                      | -      | < 0.3  | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                             | µg/g     |                                                    | -                                      | -      | < 0.08 | -       | -      | -       | -      | -      | -       | -      |
| malatión                              | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| metidatión                            | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                        | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| paratión                              | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| forato                                | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| fosalone                              | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| phosmet                               | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| terbufos                              | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                       | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos de Petróleo CCME</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida              | µg/g     |                                                    | -                                      | -      | < 5    | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)                | µg/g     |                                                    | -                                      | -      | < 5    | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | 7.9    | -      | 6.6     | 6.3    | 6.1     | 6.9    | 6      | 6.2     | 6.3    |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.15 | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | 27.8   | 29      | 47.9   |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | 10,800 | -      | 8,900   | 8,060  | 12,700  | 11,700 | 12,400 | 16,800  | 16,500 |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | < 10   | -      | < 0.1   | < 0.1  | < 0.1   | < 0.1  | < 0.1  | < 0.1   | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | < 10   | -      | 0.1     | 0.3    | 2.7     | 2.9    | 2.4    | 2.1     | 2      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | 112    | -      | 34      | 37     | 64      | 58     | 85     | 100     | 76     |
| berilio (Be)                              | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | < 1     | < 1    | < 1    | < 1     | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | 2       | < 1    | < 1    | 1       | < 1    |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | < 0.5  | -      | < 0.2   | < 0.2  | < 0.2   | < 0.2  | < 0.2  | < 0.2   | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | 1,720  | -      | 408     | 483    | 1,000   | 1,620  | 929    | 1,210   | 1,210  |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | 14     | -      | < 2     | 11     | 22      | 29     | 15     | 20      | 13     |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | 10     | -      | 2       | 5      | 16      | 13     | 21     | 21      | 18     |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | 124    | -      | 21      | 53     | 46      | 38     | 61     | 61      | 53     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | 19,400 | -      | 9,830   | 12,200 | 54,400  | 36,300 | 51,500 | 64,500  | 34,700 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | 9      | -      | 1.8     | 3.5    | 6.6     | 4.6    | 6.5    | 6.7     | 6.4    |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | 1,120  | -      | 567     | 1,170  | 2,660   | 3,520  | 2,120  | 3,400   | 1,770  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | 963    | -      | 162     | 269    | 706     | 696    | 857    | 790     | 916    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | 0.05   | -      | < 0.01  | < 0.01 | 0.01    | < 0.01 | 0.01   | 0.01    | 0.02   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | < 4    | -      | 0.3     | 1.1    | 0.9     | 1.1    | 1.3    | 1.4     | 1.2    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | 4      | -      | < 2     | 3      | 5       | 5      | 6      | 5       | 4      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | 308    | -      | 192     | 137    | 325     | 387    | 283    | 387     | 293    |
| potasio (K)                               | µg/g        |                                                    | -                                      | 198    | -      | 57      | 161    | 230     | 223    | 334    | 427     | 360    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | < 2    | -      | < 0.2   | 0.3    | 0.3     | 0.5    | 0.6    | 0.3     | 0.6    |
| plata (Ag)                                | µg/g        |                                                    | -                                      | < 2    | -      | < 0.1   | < 0.1  | < 0.1   | < 0.1  | < 0.1  | < 0.1   | 0.1    |
| sodio (Na)                                | µg/g        |                                                    | -                                      | 147    | -      | 9       | 23     | 43      | 101    | 31     | 41      | 30     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | 23     | -      | 8       | 8      | 11      | 14     | 9      | 13      | 11     |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | < 0.1   | < 0.1  | < 0.1  | < 0.1   | < 0.1  |

Tabla 7 Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |         |         |         |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|---------|---------|---------|
|                                                           |          |                                                    | W-3                                    |        |        |         |        | W-4     |        |         |         |         |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07  | Sept-08 | Nov-08  |
| estaño (Sn)                                               | µg/g     |                                                    | -                                      | < 5    | -      | < 5     | < 5    | < 5     | < 5    | < 5     | < 5     | < 5     |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | 110    | -      | 211     | 236    | 366     | 134    | 90      | 217     | 71      |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | 57     | -      | 40      | 50     | 148     | 81     | 104     | 130     | 94      |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | 74     | -      | 26      | 42     | 69      | 62     | 56      | 68      | 44      |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | 1      | -      | 2       | 1      | 4       | 2      | 3       | 5       | 3       |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| Dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| MCPPP                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1   | < 0.1   | < 0.1   |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.03  | -       |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.018 | < 0.03  | -       |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | < 0.03  | -       |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | < 0.03  | -       |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.005 | < 0.005 |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |         |         |         |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|---------|---------|---------|
|                                              |          |                                                    | W-3                                    |        |        |         |        | W-4     |        |         |         |         |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07  | Sept-08 | Nov-08  |
| o,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| p,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| o,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| p,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.003 | < 0.003 | < 0.003 |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.001 | < 0.001 | < 0.001 |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.01  | < 0.01  |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.3   | < 0.3   | < 0.3   |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03  | < 0.03  | < 0.03  |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03  | < 0.03  | < 0.03  |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03  | < 0.03  | < 0.03  |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03  | < 0.03  | < 0.03  |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03  | < 0.03  | < 0.03  |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |         |         |         |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.05  | < 0.05  | < 0.05  |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.05  | < 0.05  |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.05  | < 0.05  |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -       |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05  |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |         |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|---------|---------|--------|
|                               |          |                                                    | W-3                                    |        |        |         |        | W-4     |        |         |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07  | Sept-08 | Nov-08 |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | < 0.005 | < 0.05  | < 0.05 |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.01  | < 0.05  | < 0.05 |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -       | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |         |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.3   | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.4   | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.4   | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2   | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2   | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2   | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.4   | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1   | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1   | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.4   | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2   | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2   | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |         |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05  | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05  | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05  | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.08  | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.08  | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02  | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-3                                    |        |        |         |        | W-4     |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| propazina                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.02 | -       | -      |
| simazina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03 | -       | -      |
| terbutrina                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03 | -       | -      |
| triadimefon                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.07 | -       | -      |
| trifluralina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05 | -       | -      |
| <b>Pesticidas Organofosforado</b>     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2  | -       | -      |
| clorfenvinfos                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.07 | -       | -      |
| clorpirifos                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05 | -       | -      |
| demeton                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2  | -       | -      |
| diazinón                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03 | -       | -      |
| dimetoato                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.08 | -       | -      |
| disulfotón                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.04 | -       | -      |
| etión                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.06 | -       | -      |
| fenitrotión                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.09 | -       | -      |
| fentiión                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1  | -       | -      |
| fonofos                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.3  | -       | -      |
| isofenfos                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.08 | -       | -      |
| malatión                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1  | -       | -      |
| metidatión                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.05 | -       | -      |
| metil paratión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.04 | -       | -      |
| paratión                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.04 | -       | -      |
| forato                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.04 | -       | -      |
| fosalone                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1  | -       | -      |
| phosmet                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.1  | -       | -      |
| terbufos                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.2  | -       | -      |
| tetraclorvinfos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 0.03 | -       | -      |
| <b>Hidrocarburos de Petróleo CCME</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 5    | -       | -      |
| F1 menos BTEX (C6-C10)                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | < 5    | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | 6.7    | 6.4     | 7.1    | -       | 6.4    | -      | 5.6     | 6.4    |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | < 0.15 | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | 27.5   | 23.4    | 23.1   | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | 9,960  | 13,900  | 10,700 | -       | 30,600 | -      | 34,900  | 24,400 |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | < 0.1  | < 0.1   | < 0.1  | -       | < 10   | -      | < 0.1   | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | 1.4    | 1.4     | 1.8    | -       | < 10   | -      | 3.1     | 2.5    |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | 52     | 60      | 48     | -       | 118    | -      | 126     | 115    |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | < 1    | < 1     | < 1    | -       | < 1    | -      | < 1     | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | < 1    | < 1     | < 1    | -       | < 1    | -      | < 1     | < 1    |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | < 0.2  | < 0.2   | < 0.2  | -       | < 0.5  | -      | < 0.2   | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | 1,260  | 878     | 636    | -       | 2,660  | -      | 975     | 1,550  |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | 116    | 60      | 65     | -       | 25     | -      | 20      | 15     |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | 20     | 16      | 11     | -       | 26     | -      | 27      | 18     |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | 153    | 222     | 205    | -       | 74     | -      | 83      | 64     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | 50,700 | 31,400  | 26,600 | -       | 48,500 | -      | 72,300  | 51,200 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | 5.8    | 8.2     | 12.8   | -       | 13     | -      | 6.2     | 5.9    |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | 3,930  | 4,430   | 2,820  | -       | 6,800  | -      | 4,280   | 3,840  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | 530    | 644     | 499    | -       | 746    | -      | 709     | 662    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | 0.01   | < 0.01  | < 0.01 | -       | 0.02   | -      | 0.03    | 0.03   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | 4.6    | 8.6     | 9.1    | -       | < 4    | -      | 0.8     | 1.2    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | 24     | 14      | 11     | -       | 10     | -      | 9       | 7      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | 206    | 288     | 247    | -       | 653    | -      | 353     | 371    |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | 146    | 243     | 235    | -       | 306    | -      | 236     | 295    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | 0.6    | 1       | 1      | -       | < 2    | -      | 0.7     | 0.8    |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | < 0.1  | < 0.1   | < 0.1  | -       | < 2    | -      | < 0.1   | < 0.1  |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | 39     | 25      | 32     | -       | 170    | -      | 45      | 59     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | 11     | 8       | 6      | -       | 32     | -      | 14      | 20     |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | < 0.1  | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | < 0.1  |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |         |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|---------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-5                                    |        |         |         |         | W-6     |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08  | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| estaño (Sn)                                               | µg/g     |                                                    | -                                      | -      | < 5     | < 5     | < 5     | -       | < 5    | -      | < 5     | < 5    |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | -      | 318     | 182     | 172     | -       | 419    | -      | 182     | 194    |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | -      | 108     | 80      | 70      | -       | 185    | -      | 160     | 105    |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | -      | 60      | 72      | 62      | -       | 81     | -      | 62      | 62     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | 2       | 1       | 1       | -       | 7      | -      | 3       | 4      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| MCPPP                                                     | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | < 0.1   | < 0.1   | < 0.1   | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-Inyección Directa    |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | < 0.005 | < 0.03  | -       | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | < 0.018 | < 0.03  | -       | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | < 0.02  | < 0.03  | -       | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | < 0.02  | < 0.03  | -       | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| aldrin                                                    | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | < 0.005 | < 0.005 | < 0.005 | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |         |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|---------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-5                                    |        |         |         |         | W-6     |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08  | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| o,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| p,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| o,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| p,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | < 0.003 | < 0.003 | < 0.003 | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | < 0.001 | < 0.001 | < 0.001 | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.01  | < 0.01  | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | < 0.3   | < 0.3   | < 0.3   | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | < 0.03  | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | < 0.03  | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | < 0.03  | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | < 0.03  | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | < 0.03  | < 0.03  | < 0.03  | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |         |         |         |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | < 0.05  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | < 0.005 | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | < 0.005 | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| Total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -       | -       | -       | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05  | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |         |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|---------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-5                                    |        |         |         |        | W-6     |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07  | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | < 0.005 | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | < 0.01  | < 0.05  | < 0.05 | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -       | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | < 0.3   | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | < 0.1   | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | < 0.1   | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | < 0.4   | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | < 0.2   | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |         |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | < 0.05  | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | < 0.08  | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | < 0.08  | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | < 0.02  | -       | -      | -       | -      | -      | -       | -      |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-5                                    |        |        |         |        | W-6     |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| propazina                             | µg/g     |                                                    | -                                      | -      | < 0.02 | -       | -      | -       | -      | -      | -       | -      |
| simazina                              | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                            | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                           | µg/g     |                                                    | -                                      | -      | < 0.07 | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                          | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organofosforado</b>     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                         | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                         | µg/g     |                                                    | -                                      | -      | < 0.07 | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                           | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| demeton                               | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| diazinón                              | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                             | µg/g     |                                                    | -                                      | -      | < 0.08 | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                            | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| etión                                 | µg/g     |                                                    | -                                      | -      | < 0.06 | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                           | µg/g     |                                                    | -                                      | -      | < 0.09 | -       | -      | -       | -      | -      | -       | -      |
| fentión                               | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| fonofos                               | µg/g     |                                                    | -                                      | -      | < 0.3  | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                             | µg/g     |                                                    | -                                      | -      | < 0.08 | -       | -      | -       | -      | -      | -       | -      |
| malatión                              | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| metidatión                            | µg/g     |                                                    | -                                      | -      | < 0.05 | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                        | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| paratión                              | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| forato                                | µg/g     |                                                    | -                                      | -      | < 0.04 | -       | -      | -       | -      | -      | -       | -      |
| fosalone                              | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| phosmet                               | µg/g     |                                                    | -                                      | -      | < 0.1  | -       | -      | -       | -      | -      | -       | -      |
| terbufos                              | µg/g     |                                                    | -                                      | -      | < 0.2  | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                       | µg/g     |                                                    | -                                      | -      | < 0.03 | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos de Petróleo CCME</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida              | µg/g     |                                                    | -                                      | -      | < 5    | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)                | µg/g     |                                                    | -                                      | -      | < 5    | -       | -      | -       | -      | -      | -       | -      |

Tabla 7 Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | Unidades pH |                                                    | -                                      | -      | -      | 6.5     | 6.2    | -       | 5.7    | -      | 6.3     | 6      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | 20,200  | 17,300 | -       | 22,900 | -      | 16,900  | 14,900 |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | < 10   | -      | < 0.1   | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | 2.9     | 3.3    | -       | < 10   | -      | 2.6     | 2.6    |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | 89      | 112    | -       | 77     | -      | 99      | 74     |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | < 1    | -      | < 1     | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | < 1    | -      | < 1     | < 1    |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | < 0.2   | < 0.2  | -       | < 0.5  | -      | < 0.2   | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | 1,680   | 1,590  | -       | 2,330  | -      | 1,110   | 882    |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | 20      | 19     | -       | 18     | -      | 16      | 17     |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | 15      | 15     | -       | 21     | -      | 23      | 15     |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | 60      | 60     | -       | 65     | -      | 75      | 56     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | 54,200  | 48,700 | -       | 46,300 | -      | 62,300  | 386,00 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | 4.5     | 5.2    | -       | 11     | -      | 8.7     | 7      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | 7,320   | 5,830  | -       | 6,140  | -      | 3,190   | 2,200  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | 489     | 534    | -       | 984    | -      | 1,090   | 780    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | 0.01    | 0.02   | -       | 0.02   | -      | 0.01    | 0.01   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | 1.3     | 1.5    | -       | < 4    | -      | 1.8     | 1.7    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | 7       | 6      | -       | 6      | -      | 5       | 5      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | 432     | 374    | -       | 425    | -      | 381     | 308    |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | 315     | 311    | -       | 329    | -      | 492     | 357    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | 0.7     | 1      | -       | < 2    | -      | 0.2     | 0.6    |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | < 2    | -      | < 0.1   | 0.1    |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | 74      | 61     | -       | 201    | -      | 34      | 41     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | 21      | 23     | -       | 23     | -      | 10      | 8      |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| talio (Tl)                                                | µg/g     |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | < 0.1  |
| estaño (Sn)                                               | µg/g     |                                                    | -                                      | -      | -      | < 5     | < 5    | -       | < 5    | -      | < 5     | < 5    |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | -      | -      | 319     | 252    | -       | 155    | -      | 166     | 103    |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | -      | -      | 111     | 94     | -       | 152    | -      | 114     | 104    |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | -      | -      | 61      | 63     | -       | 68     | -      | 59      | 47     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | 3       | 4      | -       | 7      | -      | 5       | 3      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-Extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDD                               | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| benzo(a)antraceno             | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-7                                    |        |        |         |        | W-8     |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| prometryn                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en SUELOS       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | Unidades pH |                                                    | -                                      | 6.1    | -      | 6.7     | 6.5    | -       | 6      | -      | 6       | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | 12,350 | -      | 5,550   | 7,530  | -       | 16,200 | -      | 16,600  | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | < 0.1  | -      | < 0.1   | < 0.1  | -       | < 10   | -      | < 0.1   | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | 0.45   | -      | 0.2     | 0.4    | -       | < 10   | -      | 1.5     | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | 99     | -      | 30      | 56     | -       | 67     | -      | 56      | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | -       | < 1    | -      | < 1     | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | -       | < 1    | -      | < 1     | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | 0.45   | -      | 0.2     | 0.2    | -       | < 0.5  | -      | 0.2     | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | 801.5  | -      | 416     | 548    | -       | 598    | -      | 456     | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | 20     | -      | 18      | 18     | -       | 22     | -      | 21      | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | 18.5   | -      | 5       | 10     | -       | 11     | -      | 9       | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | 203    | -      | 54      | 117    | -       | 106    | -      | 117     | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | 24,800 | -      | 12,100  | 19,400 | -       | 31,500 | -      | 30,700  | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | 13.05  | -      | 6       | 10     | -       | 12     | -      | 7.4     | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | 2,215  | -      | 1,390   | 1,640  | -       | 4,190  | -      | 4,350   | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | 1,645  | -      | 420     | 752    | -       | 703    | -      | 425     | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | 0.02   | -      | < 0.01  | 0.01   | -       | < 0.01 | -      | 0.01    | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | 4.5    | -      | 1.3     | 4.8    | -       | 5      | -      | 4.1     | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | 4.5    | -      | < 2     | 3      | -       | 4      | -      | 4       | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | 251.5  | -      | 127     | 182    | -       | 316    | -      | 236     | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | 195.5  | -      | 158     | 203    | -       | 304    | -      | 296     | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | 0.4    | -      | < 0.2   | 0.3    | -       | < 2    | -      | 0.3     | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | 0.1    | -      | < 0.1   | < 0.1  | -       | < 2    | -      | < 0.1   | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | 27.5   | -      | < 5     | 18     | -       | 35     | -      | 9       | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | 10     | -      | 6       | 10     | -       | 7      | -      | 5       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| talio (Tl)                                                | µg/g     |                                                    | -                                      | < 0.1  | -      | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | -      |
| estaño (Sn)                                               | µg/g     |                                                    | -                                      | < 5    | -      | < 5     | < 5    | -       | < 5    | -      | < 5     | -      |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | 117.5  | -      | 153     | 186    | -       | 155    | -      | 210     | -      |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | 72.5   | -      | 41      | 63     | -       | 88     | -      | 96      | -      |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | 151.5  | -      | 76      | 96     | -       | 110    | -      | 118     | -      |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | < 1    | -      | < 1     | < 1    | -       | 3      | -      | 1       | -      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7 Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDD                               | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| benzo(a)antraceno             | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-9                                    |        |        |         |        | W-10    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| prometryn                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |  |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|--|
|                                           |             |                                                    | W-11                                   |        |        |         |        | W-12    |        |        |         |        |  |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |  |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |  |
| pH                                        | Unidades pH |                                                    | -                                      | -      | -      | -       | -      | -       | 7.5    | -      | 5.7     | 6.4    |  |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |  |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |  |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |  |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |  |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |  |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 25,800 | -      | 8,890   | 8,680  |  |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 10   | -      | < 0.1   | < 0.1  |  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | -       | -      | -       | < 10   | -      | 0.4     | 0.5    |  |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 93     | -      | 40      | 39     |  |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 1    | -      | < 1     | < 1    |  |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 1    | -      | < 1     | < 1    |  |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | -       | -      | -       | < 0.5  | -      | < 0.2   | < 0.2  |  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 1,490  | -      | 594     | 582    |  |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | -       | -      | -       | 34     | -      | 7       | 10     |  |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 16     | -      | 6       | 5      |  |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | -       | -      | -       | 113    | -      | 45      | 43     |  |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 59,100 | -      | 36,000  | 17,400 |  |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | -       | -      | -       | 12     | -      | 3.1     | 1.8    |  |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 4,220  | -      | 1,490   | 1,360  |  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 590    | -      | 208     | 203    |  |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | -       | -      | -       | < 0.01 | -      | 0.01    | < 0.01 |  |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 4    | -      | 0.5     | 1      |  |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 5      | -      | 3       | 2      |  |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 637    | -      | 192     | 201    |  |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 482    | -      | 246     | 217    |  |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 2    | -      | < 0.2   | 0.2    |  |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | < 2    | -      | < 0.1   | < 0.1  |  |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 171    | -      | 16      | 42     |  |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | 17     | -      | 9       | 9      |  |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | < 0.1   | < 0.1  |  |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                                                        | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                  |          |                                                    | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                                                  |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| estaño (Sn)                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | < 5    | -      | < 5     | < 5    |
| titanio (Ti)                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | 383    | -      | 361     | 279    |
| vanadio (V)                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | 293    | -      | 176     | 85     |
| zinc (Zn)                                                        | µg/g     | 123                                                | -                                      | -      | -      | -       | -      | -       | 77     | -      | 33      | 23     |
| zirconio (Zr)                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | 4      | -      | 1       | 1      |
| <b>Herbicidas Clorados Ácidos</b>                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Volátiles Monocíclicos-inyección Directa</b>    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHS6-10                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas organoclorados</b>                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                               | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| o,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                      | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-11                                   |        |        |         |        | W-12    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| propazina                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organofosforado</b>     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos de Petróleo CCME</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | Unidades pH |                                                    | -                                      | 5.8    | -      | 5.8     | -      | -       | -      | -      | 6.4     | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | 6,430  | -      | 8,420   | -      | -       | -      | -      | 5,880   | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | < 10   | -      | < 0.1   | -      | -       | -      | -      | < 0.1   | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | < 10   | -      | 0.2     | -      | -       | -      | -      | 0.2     | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | 39     | -      | 46      | -      | -       | -      | -      | 26      | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | -      | -       | -      | -      | < 1     | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | -      | -       | -      | -      | < 1     | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | < 0.5  | -      | < 0.2   | -      | -       | -      | -      | < 0.2   | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | 618    | -      | 614     | -      | -       | -      | -      | 471     | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | 7      | -      | 4       | -      | -       | -      | -      | 8       | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | 4      | -      | 4       | -      | -       | -      | -      | 5       | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | 29     | -      | 40      | -      | -       | -      | -      | 23      | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | 15,300 | -      | 13,600  | -      | -       | -      | -      | 30,300  | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | < 5    | -      | 1.7     | -      | -       | -      | -      | 1.5     | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | 1,150  | -      | 1,370   | -      | -       | -      | -      | 845     | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | 148    | -      | 173     | -      | -       | -      | -      | 153     | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | 0.01   | -      | < 0.01  | -      | -       | -      | -      | < 0.01  | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | < 4    | -      | 0.6     | -      | -       | -      | -      | 0.4     | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | < 2    | -      | < 2     | -      | -       | -      | -      | < 2     | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | 145    | -      | 164     | -      | -       | -      | -      | 174     | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | 214    | -      | 289     | -      | -       | -      | -      | 141     | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | < 2    | -      | < 0.2   | -      | -       | -      | -      | < 0.2   | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | < 2    | -      | < 0.1   | -      | -       | -      | -      | < 0.1   | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | 27     | -      | 11      | -      | -       | -      | -      | 11      | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | 11     | -      | 14      | -      | -       | -      | -      | 13      | -      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | -      | -       | -      | -      | < 0.1   | -      |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | < 5    | -      | < 5     | -      | -       | -      | -      | < 5     | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                        | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                  |          |                                                    | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                                                  |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| titanio (Ti)                                                     | µg/g     |                                                    | -                                      | 261    | -      | 368     | -      | -       | -      | -      | 375     | -      |
| vanadio (V)                                                      | µg/g     |                                                    | -                                      | 64     | -      | 56      | -      | -       | -      | -      | 148     | -      |
| zinc (Zn)                                                        | µg/g     | 123                                                | -                                      | 26     | -      | 26      | -      | -       | -      | -      | 24      | -      |
| zirconio (Zr)                                                    | µg/g     |                                                    | -                                      | 2      | -      | 1       | -      | -       | -      | -      | 1       | -      |
| <b>Herbicidas Clorados Ácidos</b>                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Volátiles Monocíclicos-inyección Directa</b>    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHS6-10                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organoclorados</b>                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Aldrín                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Alfa-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Beta-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Delta-BHC                                                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Gama-BHC (Lindano)                                               | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Alfa-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Gama-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                          | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                          | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| o,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                      | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                                      | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| benzo(k)fluoranteno           | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-13                                   |        |        |         |        | W-14    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| terbutrina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | 7.1    | -      | 6.6     | 6.3    | -       | -      | -      | 6       | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | 20,500 | -      | 23,600  | 17,500 | -       | -      | -      | 35,800  | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | < 10   | -      | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | < 10   | -      | 2.3     | 2.6    | -       | -      | -      | 2.4     | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | 138    | -      | 129     | 126    | -       | -      | -      | 178     | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | -       | -      | -      | < 1     | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | < 1    | -      | < 1     | < 1    | -       | -      | -      | < 1     | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | < 0.5  | -      | < 0.2   | < 0.2  | -       | -      | -      | < 0.2   | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | 2,480  | -      | 2,200   | 2,050  | -       | -      | -      | 2,450   | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | 16     | -      | 19      | 26     | -       | -      | -      | 20      | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | 16     | -      | 19      | 16     | -       | -      | -      | 24      | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | 45     | -      | 65      | 57     | -       | -      | -      | 86      | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | 32,600 | -      | 54,000  | 50,200 | -       | -      | -      | 57,900  | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | 8      | -      | 4.8     | 5.5    | -       | -      | -      | 4.8     | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | 6,130  | -      | 6,560   | 5,210  | -       | -      | -      | 4,570   | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | 647    | -      | 675     | 625    | -       | -      | -      | 757     | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | 0.01   | -      | 0.02    | 0.03   | -       | -      | -      | 0.04    | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | < 4    | -      | 1.2     | 1.2    | -       | -      | -      | 0.8     | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | 6      | -      | 8       | 8      | -       | -      | -      | 12      | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | 503    | -      | 472     | 378    | -       | -      | -      | 435     | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | 328    | -      | 387     | 329    | -       | -      | -      | 400     | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | < 2    | -      | 0.8     | 0.7    | -       | -      | -      | 0.8     | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | < 2    | -      | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | 133    | -      | 66      | 77     | -       | -      | -      | 676     | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | 67     | -      | 27      | 28     | -       | -      | -      | 42      | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| talio (Tl)                                                | µg/g     |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | < 0.1   | -      |
| estaño (Sn)                                               | µg/g     |                                                    | -                                      | < 5    | -      | < 5     | < 5    | -       | -      | -      | < 5     | -      |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | 287    | -      | 318     | 383    | -       | -      | -      | 326     | -      |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | 87     | -      | 115     | 141    | -       | -      | -      | 118     | -      |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | 54     | -      | 65      | 67     | -       | -      | -      | 70      | -      |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | 5      | -      | 3       | 4      | -       | -      | -      | 6       | -      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDD                               | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                               | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| benzo(a)antraceno             | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                       | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-15                                   |        |        |         |        | W-16    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| prometryn                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 7 Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | 6.1                                    | 6.8    | -      | 6.8     | -      | 6.5     | 6.7    | -      | 6.9     | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | 10,100                                 | 11,000 | -      | 10,300  | -      | 17,500  | 16,300 | -      | 24,800  | -      |
| antimonio (Sb)                            | µg/g        |                                                    | < 0.1                                  | < 10   | -      | < 0.1   | -      | < 0.1   | < 0.1  | -      | < 0.1   | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | 2                                      | < 10   | -      | 1.1     | -      | 1.8     | 2.6    | -      | 2.9     | -      |
| bario (Ba)                                | µg/g        |                                                    | 101                                    | 69     | -      | 50      | -      | 129     | 170    | -      | 161     | -      |
| berilio (Be)                              | µg/g        |                                                    | < 1                                    | < 1    | -      | < 1     | -      | < 1     | < 1    | -      | < 1     | -      |
| boro (B)                                  | µg/g        |                                                    | 2                                      | < 1    | -      | < 1     | -      | < 1     | < 1    | -      | < 1     | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | < 0.2                                  | < 0.5  | -      | < 0.2   | -      | 0.4     | 0.4    | -      | 0.7     | -      |
| calcio (Ca)                               | µg/g        |                                                    | 466                                    | 384    | -      | 525     | -      | 797     | 672    | -      | 951     | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | 14                                     | 20     | -      | 19      | -      | 21      | 13     | -      | 22      | -      |
| cobalto (Co)                              | µg/g        |                                                    | 14                                     | 13     | -      | 8       | -      | 27      | 49     | -      | 31      | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | 264                                    | 296    | -      | 230     | -      | 116     | 110    | -      | 138     | -      |
| hierro (Fe)                               | µg/g        |                                                    | 29,400                                 | 28,700 | -      | 20,800  | -      | 52,200  | 60,900 | -      | 77,000  | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | 7.8                                    | 9      | -      | 5.5     | -      | 70.8    | 46.4   | -      | 63.9    | -      |
| magnesio (Mg)                             | µg/g        |                                                    | 1,570                                  | 2,070  | -      | 2,380   | -      | 4,340   | 3,080  | -      | 4,480   | -      |
| manganeso (Mn)                            | µg/g        |                                                    | 648                                    | 641    | -      | 358     | -      | 1,470   | 2,290  | -      | 2,070   | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | < 0.01                                 | < 0.01 | -      | < 0.01  | -      | 0.01    | 0.01   | -      | 0.01    | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | 11.5                                   | 27     | -      | 8.2     | -      | 1.4     | 1.6    | -      | 3.3     | -      |
| níquel (Ni)                               | µg/g        |                                                    | 4                                      | 4      | -      | 6       | -      | 6       | 6      | -      | 6       | -      |
| fósforo (P)                               | µg/g        |                                                    | 316                                    | 240    | -      | 225     | -      | 396     | 418    | -      | 495     | -      |
| potasio (K)                               | µg/g        |                                                    | 266                                    | 233    | -      | 299     | -      | 271     | 267    | -      | 328     | -      |
| selenio (Se)                              | µg/g        |                                                    | 1.6                                    | < 2    | -      | 0.8     | -      | 0.6     | 0.4    | -      | 0.4     | -      |
| plata (Ag)                                | µg/g        |                                                    | 0.1                                    | < 2    | -      | < 0.1   | -      | < 0.1   | < 0.1  | -      | < 0.1   | -      |
| sodio (Na)                                | µg/g        |                                                    | 17                                     | 8      | -      | 29      | -      | 17      | 15     | -      | 6       | -      |
| estroncio (Sr)                            | µg/g        |                                                    | 8                                      | 6      | -      | 7       | -      | 13      | 8      | -      | 13      | -      |
| talio (Tl)                                | µg/g        |                                                    | < 0.1                                  | -      | -      | < 0.1   | -      | < 0.1   | < 0.1  | -      | < 0.1   | -      |
| estaño (Sn)                               | µg/g        |                                                    | < 5                                    | < 5    | -      | < 5     | -      | < 5     | < 5    | -      | < 5     | -      |

**Tabla 7**      **Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro                                                        | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|------------------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                                  |          |                                                    | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                                                  |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| titanio (Ti)                                                     | µg/g     |                                                    | 57                                     | 63     | -      | 72      | -      | 345     | 155    | -      | 318     | -      |
| vanadio (V)                                                      | µg/g     |                                                    | 61                                     | 63     | -      | 52      | -      | 171     | 117    | -      | 151     | -      |
| zinc (Zn)                                                        | µg/g     | 123                                                | 76                                     | 78     | -      | 78      | -      | 242     | 222    | -      | 252     | -      |
| zirconio (Zr)                                                    | µg/g     |                                                    | < 1                                    | 2      | -      | < 1     | -      | 4       | 5      | -      | 5       | -      |
| <b>Herbicidas Clorados Ácidos</b>                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPPP                                                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Volátiles Monocíclicos-inyección Directa</b>    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Pesticidas Organoclorados</b>                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                               | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                                    | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                          | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                          | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                          | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                          | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                     | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                               | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                        | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| indeno(1,2,3-cd)pireno        | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolaclo                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-17                                   |        |        |         |        | W-18    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | Unidades pH |                                                    | -                                      | -      | -      | 6.7     | 7      | -       | -      | -      | -       | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | 16,800  | 14,300 | -       | -      | -      | -       | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | 6       | 6.6    | -       | -      | -      | -       | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | 95      | 91     | -       | -      | -      | -       | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | < 1     | 4      | -       | -      | -      | -       | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | < 0.2   | < 0.2  | -       | -      | -      | -       | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | 1,550   | 1,660  | -       | -      | -      | -       | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | 18      | 23     | -       | -      | -      | -       | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | 13      | 13     | -       | -      | -      | -       | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | 52      | 42     | -       | -      | -      | -       | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | 62,100  | 60,100 | -       | -      | -      | -       | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | 4.7     | 5.5    | -       | -      | -      | -       | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | 5,990   | 4,720  | -       | -      | -      | -       | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | 442     | 583    | -       | -      | -      | -       | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | < 0.01  | < 0.01 | -       | -      | -      | -       | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | 1       | 0.9    | -       | -      | -      | -       | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | 5       | 6      | -       | -      | -      | -       | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | 527     | 344    | -       | -      | -      | -       | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | 363     | 323    | -       | -      | -      | -       | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | 1.1     | 1.3    | -       | -      | -      | -       | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | 61      | 53     | -       | -      | -      | -       | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | 15      | 14     | -       | -      | -      | -       | -      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | < 5     | < 5    | -       | -      | -      | -       | -      |
| titanio (Ti)                              | µg/g        |                                                    | -                                      | -      | -      | 195     | 348    | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| vanadio (V)                                               | µg/g     | 123                                                | -                                      | -      | -      | 83      | 104    | -       | -      | -      | -       | -      |
| zinc (Zn)                                                 | µg/g     |                                                    | -                                      | -      | -      | 47      | 40     | -       | -      | -      | -       | -      |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | 2       | 3      | -       | -      | -      | -       | -      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHS6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                                      | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                               | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-19                                   |        |        |         |        | W-20    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | -      | 6.9     | 6.6    | -       | -      | -      | -       | -      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | 9,510   | 16,800 | -       | -      | -      | -       | -      |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | 0.5     | 1      | -       | -      | -      | -       | -      |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | 36      | 121    | -       | -      | -      | -       | -      |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | -      |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | -      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | < 0.2   | 0.2    | -       | -      | -      | -       | -      |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | 671     | 1,980  | -       | -      | -      | -       | -      |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | 191     | 310    | -       | -      | -      | -       | -      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | 9       | 33     | -       | -      | -      | -       | -      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | 66      | 153    | -       | -      | -      | -       | -      |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | 21,600  | 58,900 | -       | -      | -      | -       | -      |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | 2.3     | 11.6   | -       | -      | -      | -       | -      |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | 2,660   | 3,520  | -       | -      | -      | -       | -      |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | 308     | 826    | -       | -      | -      | -       | -      |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | < 0.01  | 0.02   | -       | -      | -      | -       | -      |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | 1.3     | 1.6    | -       | -      | -      | -       | -      |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | 15      | 52     | -       | -      | -      | -       | -      |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | 268     | 307    | -       | -      | -      | -       | -      |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | 121     | 158    | -       | -      | -      | -       | -      |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | < 0.2   | 0.3    | -       | -      | -      | -       | -      |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | 22      | 48     | -       | -      | -      | -       | -      |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | 6       | 18     | -       | -      | -      | -       | -      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | -      |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | < 5     | < 5    | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | -      | -      | 250     | 407    | -       | -      | -      | -       | -      |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | -      | -      | 114     | 167    | -       | -      | -      | -       | -      |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | -      | -      | 55      | 144    | -       | -      | -      | -       | -      |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | 1       | 3      | -       | -      | -      | -       | -      |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPPP                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                     | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                               | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                        | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| indeno(1,2,3-cd)pireno        | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-21                                   |        |        |         |        | W-22    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7 Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | -      | 6.6     | 6.5    | -       | -      | -      | -       | 5.5    |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | 4000    | 5030   | -       | -      | -      | -       | 10,600 |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | 0.1     | 0.2    | -       | -      | -      | -       | 4.4    |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | 23      | 19     | -       | -      | -      | -       | 23     |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | < 1    |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | < 0.2   | < 0.2  | -       | -      | -      | -       | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | 393     | 333    | -       | -      | -      | -       | 221    |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | 4       | 2      | -       | -      | -      | -       | 20     |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | 4       | 2      | -       | -      | -      | -       | 7      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | 26      | 23     | -       | -      | -      | -       | 157    |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | 28,000  | 9,370  | -       | -      | -      | -       | 80,800 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | 1.2     | 1      | -       | -      | -      | -       | 9.7    |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | 494     | 570    | -       | -      | -      | -       | 1,380  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | 192     | 137    | -       | -      | -      | -       | 368    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | < 0.01  | < 0.01 | -       | -      | -      | -       | 0.04   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | 0.5     | 0.6    | -       | -      | -      | -       | 5.3    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | < 2     | < 2    | -       | -      | -      | -       | < 2    |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | 125     | 109    | -       | -      | -      | -       | 622    |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | 61      | 88     | -       | -      | -      | -       | 255    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | < 0.2   | < 0.2  | -       | -      | -      | -       | 7.2    |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | < 0.1  |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | < 5     | 15     | -       | -      | -      | -       | 13     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | 5       | 5      | -       | -      | -      | -       | 3      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | < 0.1   | < 0.1  | -       | -      | -      | -       | < 0.1  |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | < 5     | < 5    | -       | -      | -      | -       | < 5    |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| titanio (Ti)                                              | µg/g     |                                                    | -                                      | -      | -      | 290     | 151    | -       | -      | -      | -       | 8      |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | -      | -      | 111     | 34     | -       | -      | -      | -       | 110    |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | -      | -      | 23      | 13     | -       | -      | -      | -       | 33     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | < 1     | < 1    | -       | -      | -      | -       | < 1    |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPPP                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (Lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                       |          |                                                    | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| p,p-DDT                               | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dieldrín                              | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                     | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                               | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                        | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-23                                   |        |        |         |        | W-26    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| indeno(1,2,3-cd)pireno        | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dibenzo(a,h)antraceno         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolaclo                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |   |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|---|
|                                |          |                                                    | W-23                                   |        |        |         |        | W-26    |        |        |         |        |   |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |   |
| Pesticidas Organofosforado     |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |   |
| azinfos metil                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |   |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      | - |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | -      | -       | 6.4    | -       | -      | -      | -       | 6      |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 54,800 | -       | -      | -      | -       | 9,370  |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | -       | -      | -      | -       | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | -       | 0.5    | -       | -      | -      | -       | 5.3    |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 429    | -       | -      | -      | -       | 26     |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | -       | < 1    | -       | -      | -      | -       | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | -       | 1      | -       | -      | -      | -       | < 1    |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | -       | < 0.2  | -       | -      | -      | -       | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 2860   | -       | -      | -      | -       | 987    |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | -       | 37     | -       | -      | -      | -       | 6      |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 30     | -       | -      | -      | -       | 4      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | -       | 78     | -       | -      | -      | -       | 26     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 78,800 | -       | -      | -      | -       | 24,800 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | -       | 4.2    | -       | -      | -      | -       | 4.4    |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 3,140  | -       | -      | -      | -       | 1,150  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 1,200  | -       | -      | -      | -       | 253    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | -       | 0.06   | -       | -      | -      | -       | 0.03   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 0.4    | -       | -      | -      | -       | 2.1    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 13     | -       | -      | -      | -       | < 2    |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 634    | -       | -      | -      | -       | 294    |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 228    | -       | -      | -      | -       | 249    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 0.6    | -       | -      | -      | -       | 0.6    |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | -       | -      | -      | -       | < 0.1  |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 124    | -       | -      | -      | -       | 20     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 51     | -       | -      | -      | -       | 6      |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | -       | -      | -      | -       | < 0.1  |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | -       | < 5    | -       | -      | -      | -       | < 5    |
| titanio (Ti)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 1,650  | -       | -      | -      | -       | 3      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| vanadio (V)                                               | µg/g     | 123                                                | -                                      | -      | -      | -       | 222    | -       | -      | -      | -       | 46     |
| zinc (Zn)                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | 92     | -       | -      | -      | -       | 55     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | -       | 6      | -       | -      | -      | -       | < 1    |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHS6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                                      | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                               | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-28                                   |        |        |         |        | W-29    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                           |             |                                                    | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | -      | -       | 6.7    | -       | -      | -      | -       | 6.9    |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| Metilmercurio                             |             |                                                    |                                        |        |        | -       | -      |         |        |        | -       | -      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 14,700 | -       | -      | -      | -       | 14,900 |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | -       | -      | -      | -       | < 0.1  |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | -       | 2.3    | -       | -      | -      | -       | 2.8    |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 511    | -       | -      | -      | -       | 241    |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | -       | < 1    | -       | -      | -      | -       | < 1    |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | -       | < 1    | -       | -      | -      | -       | 1      |
| cadmio (Cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | -       | 0.4    | -       | -      | -      | -       | < 0.2  |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 752    | -       | -      | -      | -       | 2,930  |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | -       | 123    | -       | -      | -      | -       | < 2    |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 112    | -       | -      | -      | -       | 7      |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | -       | 115    | -       | -      | -      | -       | 22     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 45,800 | -       | -      | -      | -       | 28,200 |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | -       | 8.2    | -       | -      | -      | -       | 4.7    |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 2,680  | -       | -      | -      | -       | 2,110  |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 3,910  | -       | -      | -      | -       | 876    |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | -       | 0.02   | -       | -      | -      | -       | 0.02   |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 0.4    | -       | -      | -      | -       | 0.3    |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 66     | -       | -      | -      | -       | < 2    |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 230    | -       | -      | -      | -       | 221    |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 100    | -       | -      | -      | -       | 490    |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 0.2    | -       | -      | -      | -       | < 0.2  |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 0.1    | -       | -      | -      | -       | < 0.1  |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 27     | -       | -      | -      | -       | 61     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 17     | -       | -      | -      | -       | 29     |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 0.2    | -       | -      | -      | -       | < 0.1  |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | -       | < 5    | -       | -      | -      | -       | < 5    |
| titanio (Ti)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 377    | -       | -      | -      | -       | 27     |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                                           |          |                                                    | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| vanadio (V)                                               | µg/g     | 123                                                | -                                      | -      | -      | -       | 165    | -       | -      | -      | -       | 60     |
| zinc (Zn)                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | 137    | -       | -      | -      | -       | 65     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | -       | 7      | -       | -      | -      | -       | < 1    |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| MCPP                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos aromáticos monocíclicos-Extracto de metanol |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-BHC (lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| p,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|----------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                              |          |                                                    | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                              |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dieldrín                                     | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán i                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán ii                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endosulfán sulfato                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| endrina                                      | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldehído de endrina                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| heptacloro                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| epóxido de heptacloro                        | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metoxicloro                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| toxafeno                                     | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Bifenilos Policlorados</b>                |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aroclor 1242                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1248                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1254                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aroclor 1260                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total PCB                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| naftaleno                                    | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 2-metilnaftaleno                             | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenaftileno                                 | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| quinoleína                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acenafteno                                   | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoreno                                     | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenantreno                                   | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| antraceno                                    | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| acridina                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Total LMW-HAP                                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fluoranteno                                  | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| pireno                                       | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)antraceno                            | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| criseno                                      | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(b)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(k)fluoranteno                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(a)pireno                               | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| indeno(1,2,3-cd)pireno                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                               |          |                                                    | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| dibenzo(a,h)antraceno         | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| benzo(g,h,i)perileno          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Pesticidas Organofosforado    |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| azinfos metil                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |         |        |        |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------|--------|--------|---------|--------|
|                                |          |                                                    | W-33                                   |        |        |         |        | W-35    |        |        |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Sept-07 | Oct-07 | Nov-07 | Sept-08 | Nov-08 |
| clorfenvinfos                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| clorpirifos                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| demeton                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |         |        |        |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -       | -      | -      | -       | -      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |                           |        |         |            |          |        |
|-------------------------------------------|-------------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|---------|------------|----------|--------|
|                                           |             |                                                    | W-36                                   |        |        |         |        | Estadísticas <sup>4</sup> |        |         |            |          |        |
|                                           |             |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Mediana | Promedio   | St. Dev  | Conteo |
| Parámetros Convencionales en Suelos       |             |                                                    |                                        |        |        |         |        |                           |        |         |            |          |        |
| pH                                        | unidades pH |                                                    | -                                      | -      | -      | -       | 5.4    | 5.4                       | 7.9    | 6.4     | 6.1687449  | 0.47957  | 57     |
| total cianuro                             | µg/g        |                                                    | -                                      | -      | -      | -       | -      | <0.15                     | <0.15  | -       | -          | -        | 3      |
| humedad                                   | %           |                                                    | -                                      | -      | -      | -       | -      | 23.1                      | 47.9   | 27.65   | 29.95      | 8.18692  | 8      |
| Metilmercurio                             |             |                                                    |                                        |        |        |         |        |                           |        |         |            |          |        |
| metilmercurio                             |             |                                                    |                                        |        |        | -       | -      | -                         | -      | -       | -          | -        | 0      |
| Ácido Fuerte Soluble en Metales en Suelos |             |                                                    |                                        |        |        |         |        |                           |        |         |            |          |        |
| aluminio (Al)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 11,700 | 4,000                     | 54,800 | 14,900  | 16,095.789 | 8,895.34 | 57     |
| antimonio (Sb)                            | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | <0.1                      | <10    | -       | -          | -        | 57     |
| arsénico (As)                             | µg/g        | 5.9                                                | -                                      | -      | -      | -       | 1.1    | 0.1                       | 6.6    | 2.3     | 2.4991228  | 1.79016  | 57     |
| bario (Ba)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 79     | 19                        | 511    | 76      | 93.736842  | 85.3709  | 57     |
| berilio (Be)                              | µg/g        |                                                    | -                                      | -      | -      | -       | < 1    | <1                        | <1     | -       | -          | -        | 57     |
| boro (B)                                  | µg/g        |                                                    | -                                      | -      | -      | -       | < 1    | 0.5                       | 4      | 0.5     | 0.6403509  | 0.54079  | 57     |
| cadmio (cd)                               | µg/g        | 0.6                                                | -                                      | -      | -      | -       | < 0.2  | 0.1                       | 0.7    | 0.1     | 0.1692982  | 0.11679  | 57     |
| calcio (Ca)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 920    | 221                       | 2,930  | 878     | 1,092.4474 | 715.542  | 57     |
| cromo (Cr)                                | µg/g        | 37.3                                               | -                                      | -      | -      | -       | 4      | 1                         | 310    | 19      | 30.526316  | 49.0215  | 57     |
| cobalto (Co)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 6      | 2                         | 112    | 15      | 16.552632  | 15.6672  | 57     |
| cobre (Cu)                                | µg/g        | 35.7                                               | -                                      | -      | -      | -       | 19     | 19                        | 988    | 66      | 136.52632  | 183.295  | 57     |
| hierro (Fe)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 25,200 | 9,370                     | 80,800 | 45,100  | 41,387.719 | 18932.5  | 57     |
| plomo (Pb)                                | µg/g        | 35                                                 | -                                      | -      | -      | -       | 3.3    | 1                         | 70.8   | 6.5     | 10.434211  | 13.2408  | 57     |
| magnesio (Mg)                             | µg/g        |                                                    | -                                      | -      | -      | -       | 488    | 488                       | 7,320  | 3140    | 3257       | 1,857.31 | 57     |
| manganeso (Mn)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 188    | 137                       | 3,910  | 648     | 732.54386  | 606.56   | 57     |
| mercurio (Hg)                             | µg/g        | 0.17                                               | -                                      | -      | -      | -       | 0.07   | 0.005                     | 0.07   | 0.01    | 0.0149123  | 0.01419  | 57     |
| molibdeno (Mo)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 0.6    | 0.3                       | 37     | 1.5     | 4.4508772  | 7.66889  | 57     |
| níquel (Ni)                               | µg/g        |                                                    | -                                      | -      | -      | -       | < 2    | 1                         | 66     | 5       | 7.3947368  | 10.8367  | 57     |
| fósforo (P)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 525    | 109                       | 653    | 316     | 338.65789  | 141.568  | 57     |
| potasio (K)                               | µg/g        |                                                    | -                                      | -      | -      | -       | 387    | 57                        | 494    | 289     | 277.86842  | 106.49   | 57     |
| selenio (Se)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 0.9    | 0.1                       | 7.2    | 0.6     | 0.7666667  | 0.96109  | 57     |
| plata (Ag)                                | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | 0.05                      | 1      | 0.05    | 0.2245614  | 0.36168  | 57     |
| sodio (Na)                                | µg/g        |                                                    | -                                      | -      | -      | -       | 28     | 2.5                       | 676    | 31      | 56.096491  | 94.795   | 57     |
| estroncio (Sr)                            | µg/g        |                                                    | -                                      | -      | -      | -       | 11     | 3                         | 67     | 11      | 14.368421  | 11.6797  | 57     |
| talio (Tl)                                | µg/g        |                                                    | -                                      | -      | -      | -       | < 0.1  | 0.05                      | 0.2    | 0.05    | 0.0531915  | 0.02188  | 47     |
| estaño (Sn)                               | µg/g        |                                                    | -                                      | -      | -      | -       | < 5    | <5                        | <5     | -       | -          | -        | 57     |
| titanio (Ti)                              | µg/g        |                                                    | -                                      | -      | -      | -       | 9      | 3                         | 1,650  | 200     | 237.60526  | 222.059  | 57     |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |                           |        |         |           |         |        |
|-----------------------------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|---------|-----------|---------|--------|
|                                                           |          |                                                    | W-36                                   |        |        |         |        | Estadísticas <sup>4</sup> |        |         |           |         |        |
|                                                           |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Mediana | Promedio  | St. Dev | Conteo |
| vanadio (V)                                               | µg/g     |                                                    | -                                      | -      | -      | -       | 42     | 34                        | 293    | 104     | 106.67544 | 48.8274 | 57     |
| zinc (Zn)                                                 | µg/g     | 123                                                | -                                      | -      | -      | -       | 42     | 13                        | 252    | 65      | 79.429825 | 52.6056 | 57     |
| zirconio (Zr)                                             | µg/g     |                                                    | -                                      | -      | -      | -       | < 1    | 0.5                       | 7      | 2       | 2.622807  | 1.92094 | 57     |
| Herbicidas Clorados Ácidos                                |          |                                                    |                                        |        |        |         |        |                           |        |         |           |         |        |
| 2,4-D                                                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| 2,4-DB                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| 2,4,5-T                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| 2,4,5-TP                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| dicamba                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| MCPA                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| MCPD                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| picloram                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -         | -       | 8      |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                                                    |                                        |        |        |         |        |                           |        |         |           |         |        |
| benceno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.005                    | <0.03  | -       | -         | -       | 6      |
| etilbenceno                                               | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.018                    | <0.03  | -       | -         | -       | 6      |
| tolueno                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.03  | -       | -         | -       | 6      |
| xilenos                                                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.03  | -       | -         | -       | 6      |
| estireno                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -         | -       | 0      |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                                                    |                                        |        |        |         |        |                           |        |         |           |         |        |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -         | -       | 0      |
| VPHs                                                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -         | -       | 0      |
| Pesticidas Organoclorados                                 |          |                                                    |                                        |        |        |         |        |                           |        |         |           |         |        |
| aldrín                                                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -         | -       | 8      |
| alfa-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -         | -       | 8      |
| beta-BHC                                                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -         | -       | 8      |
| delta-BHC                                                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -         | -       | 8      |
| gama-BHC (lindano)                                        | µg/g     | 0.00094                                            | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -         | -       | 8      |
| alfa-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| gama-clordano                                             | µg/g     | 0.0045                                             | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| o,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |
| p,p-DDD                                                   | µg/g     | 0.00354                                            | -                                      | -      | -      | -       | -      | <0.005                    | <0.005 | -       | -         | -       | 8      |
| o,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |
| p,p-DDE                                                   | µg/g     | 0.00142                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |
| o,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |
| p,p-DDT                                                   | µg/g     | 0.00119                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |
| dieldrín                                                  | µg/g     | 0.00285                                            | -                                      | -      | -      | -       | -      | <0.003                    | <0.003 | -       | -         | -       | 8      |



Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |                           |        |         |          |         |        |
|---------------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|---------|----------|---------|--------|
|                                       |          |                                                    | W-36                                   |        |        |         |        | Estadísticas <sup>4</sup> |        |         |          |         |        |
|                                       |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Mediana | Promedio | St. Dev | Conteo |
| endosulfán i                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| endosulfán ii                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| endosulfán sulfato                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| endrina                               | µg/g     | 0.00267                                            | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| aldehído de endrina                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| heptacloro                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -        | -       | 8      |
| epóxido de heptacloro                 | µg/g     | 0.0006                                             | -                                      | -      | -      | -       | -      | <0.001                    | <0.001 | -       | -        | -       | 8      |
| metoxicloro                           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.01  | -       | -        | -       | 8      |
| toxafeno                              | µg/g     | 0.0001                                             | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -       | -        | -       | 8      |
| Bifenilos Policlorados                |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| aroclor 1242                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 8      |
| aroclor 1248                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 8      |
| aroclor 1254                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 8      |
| aroclor 1260                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 8      |
| total PCB                             | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 8      |
| Hidrocarburos Aromáticos Policíclicos |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| naftaleno                             | µg/g     | 0.0346                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| 2-metilnaftaleno                      | µg/g     | 0.0202                                             | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 8      |
| acenaftileno                          | µg/g     | 0.00587                                            | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -       | -        | -       | 8      |
| quinoleína                            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -        | -       | 0      |
| acenafteno                            | µg/g     | 0.00671                                            | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -       | -        | -       | 8      |
| fluoreno                              | µg/g     | 0.0212                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| fenantreno                            | µg/g     | 0.0419                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| antraceno                             | µg/g     | 0.0469                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| acridina                              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -        | -       | 0      |
| total LMW-HAP                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -        | -       | 0      |
| fluoranteno                           | µg/g     | 0.111                                              | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| pireno                                | µg/g     | 0.053                                              | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| benzo(a)antraceno                     | µg/g     | 0.0317                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| criseno                               | µg/g     | 0.0571                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| benzo(b)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| benzo(k)fluoranteno                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| benzo(a)pireno                        | µg/g     | 0.0319                                             | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| indeno(1,2,3-cd)pireno                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |
| dibenzo(a,h)antraceno                 | µg/g     | 0.00622                                            | -                                      | -      | -      | -       | -      | <0.005                    | <0.05  | -       | -        | -       | 8      |
| benzo(g,h,i)perileno                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.01                     | <0.05  | -       | -        | -       | 8      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                     | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |                           |        |         |          |         |        |
|-------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|---------|----------|---------|--------|
|                               |          |                                                    | W-36                                   |        |        |         |        | Estadísticas <sup>4</sup> |        |         |          |         |        |
|                               |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Mediana | Promedio | St. Dev | Conteo |
| total HMW-HAP                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -        | -       | 0      |
| total HAP                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | -                         | -      | -       | -        | -       | 0      |
| Pesticidas Carbamatos         |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| aldicarb                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -       | -        | -       | 3      |
| aldicarb sulfona              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -       | -        | -       | 3      |
| aldicarb sulfóxido            | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -       | -        | -       | 3      |
| carbaryl                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| carbofurán                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| 3-hidroxicarbofurán           | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| dioxacarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -       | -        | -       | 3      |
| metiocarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| metomilo                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| oxamyl                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.4                      | <0.4   | -       | -        | -       | 3      |
| promecarb                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| propoxur                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| Pesticidas Organonitrogenados |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| atrazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| atrazina desetil              | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| diuron                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| bromacil                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| butilato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| clorprofam                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| hexazinona                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -       | -        | -       | 3      |
| metolacoloro                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -       | -        | -       | 3      |
| metribuzin                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| prometryn                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| propazina                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.02                     | <0.02  | -       | -        | -       | 3      |
| simazina                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 3      |
| terbutrina                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 3      |
| triadimefon                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.07                     | <0.07  | -       | -        | -       | 3      |
| trifluralina                  | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| Pesticidas Organofosforado    |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| azinfos metil                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| clorfenvinfos                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.07                     | <0.07  | -       | -        | -       | 3      |
| clorpirifos                   | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| demeton                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |

Tabla 7      Tabla de Análisis de Sedimentos de Agua Dulce de la Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                      | Unidades | Criterios Ambientales Seleccionados <sup>(a)</sup> | Ubicaciones de Monitoreo de Agua Dulce |        |        |         |        |                           |        |         |          |         |        |
|--------------------------------|----------|----------------------------------------------------|----------------------------------------|--------|--------|---------|--------|---------------------------|--------|---------|----------|---------|--------|
|                                |          |                                                    | W-36                                   |        |        |         |        | Estadísticas <sup>4</sup> |        |         |          |         |        |
|                                |          |                                                    | Sept-07                                | Oct-07 | Nov-07 | Sept-08 | Nov-08 | Mínimo                    | Máximo | Mediana | Promedio | St. Dev | Conteo |
| diazinón                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 3      |
| dimetoato                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -       | -        | -       | 3      |
| disulfotón                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -       | -        | -       | 3      |
| etión                          | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.06                     | <0.06  | -       | -        | -       | 3      |
| fenitrotión                    | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.09                     | <0.09  | -       | -        | -       | 3      |
| fentión                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| fonofos                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.3                      | <0.3   | -       | -        | -       | 3      |
| isofenfos                      | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.08                     | <0.08  | -       | -        | -       | 3      |
| malatión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| metidatión                     | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.05                     | <0.05  | -       | -        | -       | 3      |
| metil paratión                 | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -       | -        | -       | 3      |
| paratión                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -       | -        | -       | 3      |
| forato                         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.04                     | <0.04  | -       | -        | -       | 3      |
| fosalone                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| phosmet                        | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.1                      | <0.1   | -       | -        | -       | 3      |
| terbufos                       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.2                      | <0.2   | -       | -        | -       | 3      |
| tetraclorvinfos                | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <0.03                     | <0.03  | -       | -        | -       | 3      |
| Hidrocarburos de Petróleo CCME |          |                                                    |                                        |        |        |         |        |                           |        |         |          |         |        |
| F1 (C6-C10) no corregida       | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <5                        | <5     | -       | -        | -       | 3      |
| F1 menos BTEX (C6-C10)         | µg/g     |                                                    | -                                      | -      | -      | -       | -      | <5                        | <5     | -       | -        | -       | 3      |

<sup>(a)</sup> – Basado en los valores seleccionados en el Apéndice XIII.

Nota: ‘-’ Indca que no hay muestras o no hay datos disponibles.

0.3

Denota una excedencia por encima de los criterios ambientales seleccionados.

Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Parámetro                                 | Unidades    | Criterios Ambientales | Río Caimito           |           |        |           | Río Petaquilla |           |        |           |
|-------------------------------------------|-------------|-----------------------|-----------------------|-----------|--------|-----------|----------------|-----------|--------|-----------|
|                                           |             |                       | Estuario <sup>4</sup> |           | Marino |           | Estuario       |           | Marino |           |
|                                           |             |                       | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08         | 20-Jun-08 | Ene-08 | 20-Jun-08 |
| Parámetros Convencionales en Suelos       |             |                       |                       |           |        |           |                |           |        |           |
| pH                                        | unidades pH |                       | 8                     | 7.7       | 7.8    | 7.9       | 7.1            | 8.3       | 7.4    | 7.5       |
| total cianuro                             | µg/g        |                       | < 0.15                | < 0.15    | 0.32   | -         | -              | -         | -      | -         |
| humedad                                   | %           |                       | 18.2                  | 23        | 20.9   | -         | -              | -         | -      | -         |
| Metilmercurio                             |             |                       |                       |           |        |           |                |           |        |           |
| metilmercurio                             |             |                       |                       |           |        |           |                |           |        |           |
| Ácido Fuerte Soluble en Metales en Suelos |             |                       |                       |           |        |           |                |           |        |           |
| aluminio (Al)                             | µg/g        |                       | 6140                  | 7,080     | 6,230  | 5,130     | 6,630          | 6,520     | 6,560  | 5,110     |
| antimonio (Sb)                            | µg/g        |                       | < 0.1                 | < 10      | < 0.1  | < 10      | < 0.1          | < 10      | < 0.1  | < 10      |
| arsénico (As)                             | µg/g        | 7.24                  | 10.1                  | 13        | 9.5    | 11        | 8.6            | 14        | 10.2   | 13        |
| bario (Ba)                                | µg/g        |                       | 5                     | 8         | 4      | 4         | 5              | 5         | 4      | 4         |
| berilio (Be)                              | µg/g        |                       | < 1                   | < 1       | < 1    | < 1       | < 1            | < 1       | < 1    | < 1       |
| boro (B)                                  | µg/g        |                       | 3                     | < 1       | 6      | < 1       | 5              | < 1       | 8      | < 1       |
| cadmio (Cd)                               | µg/g        | 0.7                   | < 0.2                 | < 0.5     | < 0.2  | < 0.5     | < 0.2          | < 0.5     | < 0.2  | < 0.5     |
| calcio (Ca)                               | µg/g        |                       | 8,360                 | 13,600    | 9,700  | 8,560     | 13,800         | 16,500    | 11,800 | 12,500    |
| cromo (Cr)                                | µg/g        | 52.3                  | 7                     | 17        | 23     | 9         | 31             | 16        | 14     | 8         |
| cobalto (Co)                              | µg/g        |                       | 6                     | 11        | 11     | 6         | 12             | 10        | 7      | 6         |
| cobre (Cu)                                | µg/g        | 18.7                  | 8                     | 9         | 9      | 7         | 10             | 9         | 8      | 6         |
| hierro (Fe)                               | µg/g        |                       | 11,000                | 23,600    | 29,400 | 12,800    | 40,700         | 23,500    | 18,200 | 11,300    |
| plomo (Pb)                                | µg/g        | 30.2                  | 0.9                   | < 5       | 1.7    | < 5       | 2.1            | < 5       | 1.2    | < 5       |
| magnesio (Mg)                             | µg/g        |                       | 3,960                 | 6,230     | 5,900  | 3,780     | 6,160          | 5,940     | 5,590  | 4,440     |
| manganeso (Mn)                            | µg/g        |                       | 191                   | 400       | 362    | 251       | 442            | 444       | 296    | 301       |
| mercurio (Hg)                             | µg/g        | 0.13                  | 0.01                  | < 0.01    | 0.01   | < 0.01    | 0.01           | < 0.01    | 0.01   | < 0.01    |
| molibdeno (Mo)                            | µg/g        |                       | 0.2                   | < 4       | 0.3    | < 4       | 0.2            | < 4       | 0.2    | < 4       |
| níquel (Ni)                               | µg/g        |                       | 3                     | 6         | 8      | 3         | 8              | 6         | 5      | 4         |
| fósforo (P)                               | µg/g        |                       | 126                   | 149       | 119    | 120       | 127            | 120       | 117    | 101       |
| potasio (K)                               | µg/g        |                       | 211                   | 476       | 204    | 277       | 186            | 357       | 247    | 291       |
| selenio (Se)                              | µg/g        |                       | < 0.2                 | < 2       | < 0.2  | < 2       | < 0.2          | < 2       | < 0.2  | < 2       |
| plata (Ag)                                | µg/g        |                       | < 0.1                 | < 2       | < 0.1  | < 2       | < 0.1          | < 2       | < 0.1  | < 2       |
| sodio (Na)                                | µg/g        |                       | 417                   | 516       | 759    | 568       | 766            | 358       | 1980   | 596       |
| estroncio (Sr)                            | µg/g        |                       | 60                    | 100       | 69     | 65        | 84             | 107       | 75     | 80        |
| talio (Tl)                                | µg/g        |                       | < 0.1                 | -         | < 0.1  | -         | < 0.1          | -         | < 0.1  | -         |
| estaño (Sn)                               | µg/g        |                       | < 5                   | < 5       | < 5    | < 5       | < 5            | < 5       | < 5    | < 5       |
| titanio (Ti)                              | µg/g        |                       | 210                   | 474       | 724    | 216       | 1010           | 523       | 447    | 204       |

Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales | Río Caimito           |           |         |           | Río Petaquilla |           |        |           |
|-----------------------------------------------------------|----------|-----------------------|-----------------------|-----------|---------|-----------|----------------|-----------|--------|-----------|
|                                                           |          |                       | Estuario <sup>4</sup> |           | Marino  |           | Estuario       |           | Marino |           |
|                                                           |          |                       | Ene-08                | 20-Jun-08 | Ene-08  | 20-Jun-08 | Ene-08         | 20-Jun-08 | Ene-08 | 20-Jun-08 |
| vanadio (V)                                               | µg/g     |                       | 27                    | 75        | 120     | 33        | 181            | 84        | 66     | 26        |
| zinc (Zn)                                                 | µg/g     | 124                   | 19                    | 39        | 43      | 22        | 46             | 37        | 28     | 23        |
| zirconio (Zr)                                             | µg/g     |                       | 2                     | 3         | 3       | 3         | 2              | 4         | 2      | 3         |
| Herbicidas Clorados Ácidos                                |          |                       |                       |           |         |           |                |           |        |           |
| 2,4-D                                                     | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| 2,4-DB                                                    | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| 2,4,5-T                                                   | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| 2,4,5-TP                                                  | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| dicamba                                                   | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| MCPA                                                      | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| MCPP                                                      | µg/g     |                       | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| picloram                                                  | µg/g     |                       | < 0.1                 | -         | < 0.1   | -         | -              | -         | -      | -         |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                       |                       |           |         |           |                |           |        |           |
| benceno                                                   | µg/g     |                       | < 0.04                | < 0.03    | < 0.04  | -         | -              | -         | -      | -         |
| etilbenceno                                               | µg/g     |                       | < 0.5                 | < 0.03    | < 0.5   | -         | -              | -         | -      | -         |
| tolueno                                                   | µg/g     |                       | < 0.5                 | < 0.03    | < 0.5   | -         | -              | -         | -      | -         |
| xilenos                                                   | µg/g     |                       | < 0.1                 | < 0.03    | < 0.1   | -         | -              | -         | -      | -         |
| estireno                                                  | µg/g     |                       | < 0.1                 | -         | < 0.1   | -         | -              | -         | -      | -         |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                       |                       |           |         |           |                |           |        |           |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                       | < 100                 | -         | < 100   | -         | -              | -         | -      | -         |
| VPHs                                                      | µg/g     |                       | < 100                 | -         | < 100   | -         | -              | -         | -      | -         |
| Pesticidas Organoclorados                                 |          |                       |                       |           |         |           |                |           |        |           |
| aldrín                                                    | µg/g     |                       | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| alfa-BHC                                                  | µg/g     |                       | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| beta-BHC                                                  | µg/g     |                       | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| delta-BHC                                                 | µg/g     |                       | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| gama-BHC (Lindano)                                        | µg/g     | 0.00032               | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| alfa-clordano                                             | µg/g     | 0.00226               | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| gama-clordano                                             | µg/g     | 0.00226               | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| o,p-DDD                                                   | µg/g     | 0.00122               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| p,p-DDD                                                   | µg/g     | 0.00122               | < 0.005               | -         | < 0.005 | -         | -              | -         | -      | -         |
| o,p-DDE                                                   | µg/g     | 0.00207               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| p,p-DDE                                                   | µg/g     | 0.00207               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| o,p-DDT                                                   | µg/g     | 0.00119               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| p,p-DDT                                                   | µg/g     | 0.00119               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| dieldrín                                                  | µg/g     | 0.00071               | < 0.003               | -         | < 0.003 | -         | -              | -         | -      | -         |
| endosulfán i                                              | µg/g     |                       | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |
| endosulfán ii                                             | µg/g     |                       | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |

Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                    | Unidades | Criterios Ambientales | Río Caimito           |           |         |           | Río Petaquilla |           |        |           |
|----------------------------------------------|----------|-----------------------|-----------------------|-----------|---------|-----------|----------------|-----------|--------|-----------|
|                                              |          |                       | Estuario <sup>4</sup> |           | Marino  |           | Estuario       |           | Marino |           |
|                                              |          |                       | Ene-08                | 20-Jun-08 | Ene-08  | 20-Jun-08 | Ene-08         | 20-Jun-08 | Ene-08 | 20-Jun-08 |
| endosulfán sulfato                           | µg/g     |                       | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |
| endrina                                      | µg/g     | 0.00267               | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |
| aldehído de endrina                          | µg/g     |                       | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |
| heptacloro                                   | µg/g     |                       | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| epóxido de heptacloro                        | µg/g     | 0.0006                | < 0.001               | -         | < 0.001 | -         | -              | -         | -      | -         |
| metoxicloro                                  | µg/g     |                       | < 0.01                | -         | < 0.01  | -         | -              | -         | -      | -         |
| toxafeno                                     | µg/g     |                       | < 0.3                 | -         | < 0.3   | -         | -              | -         | -      | -         |
| <b>Bifenilos Policlorados</b>                |          |                       |                       |           |         |           |                |           |        |           |
| aroclor 1242                                 | µg/g     |                       | < 0.03                | -         | < 0.03  | -         | -              | -         | -      | -         |
| aroclor 1248                                 | µg/g     |                       | < 0.03                | -         | < 0.03  | -         | -              | -         | -      | -         |
| aroclor 1254                                 | µg/g     | 0.0633                | < 0.03                | -         | < 0.03  | -         | -              | -         | -      | -         |
| aroclor 1260                                 | µg/g     |                       | < 0.03                | -         | < 0.03  | -         | -              | -         | -      | -         |
| total PCB                                    | µg/g     | 0.0215                | < 0.03                | -         | < 0.03  | -         | -              | -         | -      | -         |
| <b>Hidrocarburos Aromáticos Policíclicos</b> |          |                       |                       |           |         |           |                |           |        |           |
| naftaleno                                    | µg/g     | 0.0346                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| 2-metilnaftaleno                             | µg/g     | 0.0202                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| acenaftileno                                 | µg/g     | 0.00587               | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| quinoleína                                   | µg/g     |                       | -                     | -         | -       | -         | -              | -         | -      | -         |
| acenafteno                                   | µg/g     | 0.00671               | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| fluoreno                                     | µg/g     | 0.0212                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| fenantreno                                   | µg/g     | 0.0867                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| antraceno                                    | µg/g     | 0.0469                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| acridina                                     | µg/g     |                       | -                     | -         | -       | -         | -              | -         | -      | -         |
| total LMW-HAP                                | µg/g     |                       | -                     | -         | -       | -         | -              | -         | -      | -         |
| fluoranteno                                  | µg/g     | 0.113                 | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| pireno                                       | µg/g     | 0.153                 | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| benzo(a)antraceno                            | µg/g     | 0.0748                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| criseno                                      | µg/g     | 0.108                 | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| benzo(b)fluoranteno                          | µg/g     |                       | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| benzo(k)fluoranteno                          | µg/g     |                       | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| benzo(a)pireno                               | µg/g     | 0.0888                | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| indeno(1,2,3-cd)pireno                       | µg/g     |                       | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| dibenzo(a,h)antraceno                        | µg/g     | 0.00622               | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |
| benzo(g,h,i)perileno                         | µg/g     |                       | < 0.05                | -         | < 0.05  | -         | -              | -         | -      | -         |

| Parámetro | Unidades | Criterios Ambientales | Río Cocle del Norte   |           |        |           | Punta Rincón |              |          |          |          |          |
|-----------|----------|-----------------------|-----------------------|-----------|--------|-----------|--------------|--------------|----------|----------|----------|----------|
|           |          |                       | Estuario <sup>4</sup> |           | Marino |           | S5 (Marino)  | S14 (Marino) | B2       | B3       | B5       | B6       |
|           |          |                       | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08       | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 |

Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                 | Unidades    | Criterios Ambientales | Río Cocle del Norte   |           |        |           | Punta Rincón |              |          |          |          |          |  |
|-------------------------------------------|-------------|-----------------------|-----------------------|-----------|--------|-----------|--------------|--------------|----------|----------|----------|----------|--|
|                                           |             |                       | Estuario <sup>4</sup> |           | Marino |           | S5 (Marino)  | S14 (Marino) | B2       | B3       | B5       | B6       |  |
|                                           |             |                       | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08       | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 |  |
| Parámetros Convencionales en Suelos       |             |                       |                       |           |        |           |              |              |          |          |          |          |  |
| pH                                        | unidades pH |                       | 7.8                   | 7.4       | 8.2    | 7.2       | 8            | 7.9          | 8.4      | 8.5      | 8.5      | 8.5      |  |
| total cianuro                             | µg/g        |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |  |
| humedad                                   | %           |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |  |
| Metilmercurio                             |             |                       |                       |           |        |           |              |              |          |          |          |          |  |
| metilmercurio                             |             |                       |                       |           |        |           |              |              |          |          |          |          |  |
| Ácido Fuerte Soluble en Metales en Suelos |             |                       |                       |           |        |           |              |              |          |          |          |          |  |
| aluminio (Al)                             | µg/g        |                       | 8,200                 | 6,750     | 8,830  | 4,030     | 6,860        | 4,930        | 11,600   | 13,200   | 12,900   | 7,910    |  |
| antimonio (Sb)                            | µg/g        |                       | < 0.1                 | < 10      | < 0.1  | < 10      | < 0.1        | < 0.1        | < 0.1    | < 0.1    | < 0.1    | < 0.1    |  |
| arsénico (As)                             | µg/g        | 7.24                  | 9                     | < 10      | 10.9   | < 10      | 9            | 8.7          | 34.5     | 46.1     | 34.2     | 18.7     |  |
| bario (Ba)                                | µg/g        |                       | 8                     | 7         | 7      | 5         | 4            | 4            | 7        | 7        | 7        | 6        |  |
| berilio (be)                              | µg/g        |                       | < 1                   | < 1       | < 1    | < 1       | < 1          | < 1          | < 1      | < 1      | < 1      | < 1      |  |
| boro (B)                                  | µg/g        |                       | 5                     | < 1       | 7      | < 1       | 7            | 4            | 19       | 23       | 21       | 15       |  |
| cadmio (Cd)                               | µg/g        | 0.7                   | < 0.2                 | < 0.5     | < 0.2  | < 0.5     | < 0.2        | < 0.2        | < 0.2    | < 0.2    | < 0.2    | < 0.2    |  |
| calcio (Ca)                               | µg/g        |                       | 10,500                | 6,910     | 12,500 | 3,440     | 10,700       | 6,270        | 19,500   | 24,100   | 17,800   | 16,600   |  |
| cromo (Cr)                                | µg/g        | 52.3                  | 22                    | 34        | 21     | 38        | 19           | 6            | 22       | 24       | 24       | 23       |  |
| cobalto (Co)                              | µg/g        |                       | 14                    | 15        | 14     | 15        | 9            | 5            | 18       | 20       | 20       | 13       |  |
| cobre (Cu)                                | µg/g        | 18.7                  | 10                    | 10        | 11     | 8         | 8            | 7            | 14       | 18       | 18       | 12       |  |
| hierro (Fe)                               | µg/g        |                       | 27,000                | 38,600    | 26,900 | 46,000    | 24,200       | 10,800       | 32,900   | 34,600   | 34,200   | 28,600   |  |
| plomo (Pb)                                | µg/g        | 30.2                  | 1.4                   | < 5       | 1.5    | 6         | 1.2          | 1            | 1.9      | 2.1      | 2.2      | 1.6      |  |
| magnesio (Mg)                             | µg/g        |                       | 7,060                 | 5,460     | 8,320  | 3,010     | 5,630        | 3,520        | 11,700   | 14,100   | 12,300   | 7,830    |  |
| manganeso (Mn)                            | µg/g        |                       | 397                   | 485       | 442    | 449       | 313          | 176          | 591      | 646      | 546      | 449      |  |
| mercurio (Hg)                             | µg/g        | 0.13                  | 0.01                  | < 0.01    | 0.01   | < 0.01    | 0.01         | 0.01         | 0.02     | 0.02     | 0.02     | 0.01     |  |
| molibdeno (Mo)                            | µg/g        |                       | 0.2                   | < 4       | 0.2    | < 4       | 0.2          | 0.2          | 0.5      | 0.5      | 0.4      | 0.3      |  |
| níquel (Ni)                               | µg/g        |                       | 8                     | 9         | 9      | 8         | 6            | 3            | 11       | 13       | 12       | 8        |  |
| fósforo (P)                               | µg/g        |                       | 142                   | 139       | 153    | 96        | 114          | 117          | 214      | 242      | 237      | 173      |  |
| potasio (K)                               | µg/g        |                       | 229                   | 333       | 279    | 325       | 214          | 145          | 550      | 602      | 596      | 418      |  |
| selenio (Se)                              | µg/g        |                       | 0.2                   | < 2       | < 0.2  | < 2       | < 0.2        | < 0.2        | 0.2      | 0.3      | < 0.2    | < 0.2    |  |
| plata (Ag)                                | µg/g        |                       | < 0.1                 | < 2       | < 0.1  | < 2       | < 0.1        | < 0.1        | < 0.1    | < 0.1    | < 0.1    | < 0.1    |  |
| sodio (Na)                                | µg/g        |                       | 569                   | 339       | 854    | 985       | 1,430        | 724          | 2,770    | 3,410    | 3,090    | 2,540    |  |
| estroncio (Sr)                            | µg/g        |                       | 71                    | 42        | 96     | 21        | 71           | 41           | 177      | 220      | 175      | 142      |  |
| talio (Tl)                                | µg/g        |                       | < 0.1                 | -         | < 0.1  | -         | < 0.1        | < 0.1        | < 0.1    | < 0.1    | < 0.1    | < 0.1    |  |
| estaño (Sn)                               | µg/g        |                       | < 5                   | < 5       | < 5    | < 5       | < 5          | < 5          | < 5      | < 5      | < 5      | < 5      |  |
| titanio (Ti)                              | µg/g        |                       | 681                   | 1,320     | 612    | 2,020     | 616          | 278          | 347      | 306      | 326      | 494      |  |
| vanadio (V)                               | µg/g        |                       | 100                   | 179       | 101    | 251       | 99           | 33           | 84       | 84       | 89       | 106      |  |
| zinc (Zn)                                 | µg/g        | 124                   | 44                    | 63        | 46     | 74        | 34           | 18           | 57       | 64       | 64       | 44       |  |
| zirconio (Zr)                             | µg/g        |                       | 3                     | 6         | 3      | 5         | 2            | 2            | 4        | 4        | 4        | 3        |  |

Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                 | Unidades | Criterios Ambientales | Río Cocle del Norte   |           |        |           | Punta Rincón |              |          |          |          |          |
|-----------------------------------------------------------|----------|-----------------------|-----------------------|-----------|--------|-----------|--------------|--------------|----------|----------|----------|----------|
|                                                           |          |                       | Estuario <sup>4</sup> |           | Marino |           | S5 (Marino)  | S14 (Marino) | B2       | B3       | B5       | B6       |
|                                                           |          |                       | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08       | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 |
| Herbicidas Clorados Ácidos                                |          |                       |                       |           |        |           |              |              |          |          |          |          |
| 2,4-D                                                     | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| 2,4-DB                                                    | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| 2,4,5-T                                                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| 2,4,5-TP                                                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| dicamba                                                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| MCPA                                                      | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| MCPP                                                      | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| picloram                                                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| Hidrocarburos Volátiles Monocíclicos-inyección Directa    |          |                       |                       |           |        |           |              |              |          |          |          |          |
| benceno                                                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| etilbenceno                                               | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| tolueno                                                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| xilenos                                                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| estireno                                                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| Hidrocarburos Aromáticos Monocíclicos-extracto de Metanol |          |                       |                       |           |        |           |              |              |          |          |          |          |
| hidrocarburos volátiles VHs6-10                           | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| VPHs                                                      | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| Pesticidas Organoclorados                                 |          |                       |                       |           |        |           |              |              |          |          |          |          |
| aldrín                                                    | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| alfa-BHC                                                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| beta-BHC                                                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| delta-BHC                                                 | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| gama-BHC (lindano)                                        | µg/g     | 0.00032               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| alfa-clordano                                             | µg/g     | 0.00226               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| gama-clordano                                             | µg/g     | 0.00226               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| o,p-DDD                                                   | µg/g     | 0.00122               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| p,p-DDD                                                   | µg/g     | 0.00122               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| o,p-DDE                                                   | µg/g     | 0.00207               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| p,p-DDE                                                   | µg/g     | 0.00207               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| o,p-DDT                                                   | µg/g     | 0.00119               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| p,p-DDT                                                   | µg/g     | 0.00119               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| dieldrín                                                  | µg/g     | 0.00071               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| endosulfán i                                              | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| endosulfán ii                                             | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| endosulfán sulfato                                        | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| endrina                                                   | µg/g     | 0.00267               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |



Tabla 8 Tabla de Análisis de Sedimentos Marinos/ Estuarinos de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                             | Unidades | Criterios Ambientales | Río Cocle del Norte   |           |        |           | Punta Rincón |              |          |          |          |          |
|---------------------------------------|----------|-----------------------|-----------------------|-----------|--------|-----------|--------------|--------------|----------|----------|----------|----------|
|                                       |          |                       | Estuario <sup>4</sup> |           | Marino |           | S5 (Marino)  | S14 (Marino) | B2       | B3       | B5       | B6       |
|                                       |          |                       | Ene-08                | 20-Jun-08 | Ene-08 | 20-Jun-08 | Ene-08       | Ene-08       | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 | 1-Abr-09 |
| aldehído de endrina                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| heptacloro                            | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| epóxido de heptacloro                 | µg/g     | 0.0006                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| metoxicloro                           | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| toxafeno                              | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| Bifenilos Policlorados                |          |                       |                       |           |        |           |              |              |          |          |          |          |
| aroclor 1242                          | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| aroclor 1248                          | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| aroclor 1254                          | µg/g     | 0.0633                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| aroclor 1260                          | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| total PCB                             | µg/g     | 0.0215                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| Hidrocarburos Aromáticos Policíclicos |          |                       |                       |           |        |           |              |              |          |          |          |          |
| naftaleno                             | µg/g     | 0.0346                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| 2-metilnaftaleno                      | µg/g     | 0.0202                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| acenaftileno                          | µg/g     | 0.00587               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| quinoleína                            | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| acenafteno                            | µg/g     | 0.00671               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| fluoreno                              | µg/g     | 0.0212                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| fenantreno                            | µg/g     | 0.0867                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| antraceno                             | µg/g     | 0.0469                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| acridina                              | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| total LMW-HAP                         | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| fluoranteno                           | µg/g     | 0.113                 | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| pireno                                | µg/g     | 0.153                 | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| benzo(a)antraceno                     | µg/g     | 0.0748                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| criseno                               | µg/g     | 0.108                 | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| benzo(b)fluoranteno                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| benzo(k)fluoranteno                   | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| benzo(a)pireno                        | µg/g     | 0.0888                | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| indeno(1,2,3-cd)pireno                | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| dibenzo(a,h)antraceno                 | µg/g     | 0.00622               | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |
| benzo(g,h,i)perileno                  | µg/g     |                       | -                     | -         | -      | -         | -            | -            | -        | -        | -        | -        |

(a) – Basado en los valores seleccionados en el Apéndice XIII.

Nota: ‘-’ Indica que no hay muestras o no hay datos disponibles.

0.3

 Denota una excedencia por encima de los criterios ambientales seleccionados.

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W24 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 29.4    | 25.2    | 25.4    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.8     | 7.3     | 6.9     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 80      | 50      | 255     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 280     | 260     | 30      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.24    | 1.42    | 0.54    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.63    | 7.05    | 7.56    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 67      | 44      | 52      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 20.5    | 12.4    | 15.1    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 23.7    | 12.9    | 14.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 43      | 22      | 54      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | 2       | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | □□□                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 31.6    | 15.5    | 23.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 38.5    | 18.9    | 28.6    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/Lf                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.03    | 0.19    | 0.1     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.1     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.37    | 4.27    | 4.12    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.99    | 0.96    | 0.77    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 32      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5       | 3       | < 2     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W24 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |           |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0         | 800       | -         |
| coliformes fecales                   | CFU/100mL |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0         | 200       | -         |
| <b>Especies de Cianuro</b>           |           |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L      | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Disueltos</b>             |           |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.072     | 0.016     |
| antimonio                            | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| arsénico                             | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.012     | 0.011     | 0.011     |
| berilio                              | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.00013   | < 0.00004 |
| calcio                               | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.93      | 2.81      | 3.61      |
| cromo                                | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | < 0.0002  | 0.0005    |
| cobalto                              | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0008    | 0.0074    |
| cobre                                | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0035    | 0.0015    | 0.0025    |
| hierro                               | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.03      | 0.01      |
| plomo                                | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0007    | 0.0005    |
| litio                                | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.99      | 1.3       | 1.48      |
| manganeso                            | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0017    | 0.002     | 0.012     |
| mercurio                             | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | 0.001     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W24 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| fósforo       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.42      | 0.37      | 0.36      |
| selenio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.9      | 8.88      | 8.57      |
| plata         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.2       | 3.42      | 3.57      |
| estroncio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.045     | 0.025     | 0.03      |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0033    | 0.0008    |
| uranio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0024    | 0.0009    | 0.0016    |
| zinc          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.004     | 0.005     | 0.004     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.005     | 0.11      | 0.027     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013     | 0.011     | 0.011     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.00011   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.38      | 2.91      | 3.48      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | < 0.0002  | 0.0005    |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013     | 0.0011    | 0.0012    |

**Tabla 9**      **Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W24 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.08      | 0.03      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.49      | 1.35      | 1.49      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0018    | 0.0016    |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.42      | 0.38      | 0.33      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13.5      | 9.34      | 8.4       |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.17      | 3.51      | 3.42      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.048     | 0.025     | 0.031     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0035    | 0.001     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0024    | 0.001     | 0.0016    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.012     | 0.003     | 0.001     |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W25 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.3    | 24.3    | 24.8    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.6     | 7.08    | 7.16    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 110     | 40      | 215     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 323     | 257     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.98    | 1.16    | 0.92    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.79    | 6.99    | 7.44    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 98      | 41      | 57      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 34.9    | 12.7    | 18.2    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 37.2    | 12.6    | 18.2    |
| total de sólidos disueltos                                    | μS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90      | 23      | 56      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | 2       | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 50.6    | 15.7    | 27.6    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 61.7    | 19.1    | 33.6    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.13    | 0.18    | 0.1     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.1     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.49    | 3.49    | 3.54    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.05    | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.5     | 0.83    | 0.68    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 41      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.9     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11      | 26      | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 4     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1200    | 3100    | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 300     | 800     | -       |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W25 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.009     | 0.062     | 0.012     |
| antimonio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02      | 0.014     | 0.014     |
| berilio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8.57      | 2.89      | 4.36      |
| cromo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0017    | 0.0002    | 0.0009    |
| cobalto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0022    | 0.0005    |
| cobre                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0007    | 0.0006    |
| hierro                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.03      | 0.01      |
| plomo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.28      | 1.32      | 1.78      |
| manganeso                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0022    | 0.004     | 0.0014    |
| mercurio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| fósforo                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.06      | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.69      | 0.35      | 0.39      |
| selenio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 16.9      | 8.54      | 9.47      |
| plata                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.85      | 3.23      | 3.74      |
| estroncio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.071     | 0.025     | 0.036     |
| telurio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0025    | 0.0006    |
| uranio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0051    | 0.0011    | 0.0021    |
| zinc                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.001     | 0.002     |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W25 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.034     | 0.12      | 0.029     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.014     | 0.014     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8.61      | 2.88      | 4.35      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016    | 0.0004    | 0.0008    |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0003    | 0.0002    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04      | 0.09      | 0.03      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.8       | 1.32      | 1.78      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0031    | 0.0016    | 0.0012    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.06      | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.68      | 0.35      | 0.38      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 18        | 8.69      | 9.28      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.46      | 3.26      | 3.63      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07      | 0.025     | 0.036     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0002    | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0013    | 0.0043    | 0.0011    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.005     | 0.0011    | 0.0023    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | < 0.001   | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 28.5    | 24.4 C  | 24.8    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5       | 6.03    | 5.86    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 80      | 50      | 257     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 274     | 188     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.37    | 0.7     | 3.12    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.22    | 5.5     | 5.58    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 66      | 48      | 48      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.7    | 10.4    | 9.9     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 16.5    | 10.5    | 10.2    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 53      | 43      | 36      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6       | < 4     | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.5     | 2.8     | 3.7     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.5     | 3.5     | 4.6     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02    | 0.05    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.01    | 3.66    | 4.31    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 17.8    | 11.2    | 11.3    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 126     | < 10    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | < 1     | 2.2     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | 10      | 3       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0       | -       | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0       | -       | -       |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.01      | 0.15      | 0.081     |
| antimonio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016     | 0.013     | 0.014     |
| berilio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | 0.00004   |
| calcio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.71      | 1.8       | 1.82      |
| cromo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0022    | 0.0009    | 0.0011    |
| cobre                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0031    | 0.0032    |
| hierro                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.06      | 0.06      |
| plomo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0005    |
| magnesio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.93      | 1.43      | 1.29      |
| manganeso                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.085     | 0.082     | 0.065     |
| mercurio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0005    | 0.0004    |
| fósforo                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.21      | 0.24      | 0.24      |
| selenio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.16      | 6.5       | 4.24      |
| plata                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.57      | 2.92      | 2.83      |
| estroncio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.018     | 0.013     | 0.012     |
| telurio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| uranio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| zinc                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016     | 0.012     | 0.013     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |           |           |           |
|----------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| zirconio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| <b>Total Metales</b> |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio             | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.087     | 0.097     | 0.13      |
| antimonio            | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico             | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0002    | < 0.0002  |
| bario                | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017     | 0.013     | 0.014     |
| berilio              | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                 | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio               | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.00005   | < 0.00004 | < 0.00004 |
| calcio               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.78      | 1.84      | 1.87      |
| cromo                | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011    | 0.0027    | 0.0009    |
| cobre                | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0018    | 0.003     | 0.0029    |
| hierro               | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.17      | 0.08      | 0.12      |
| plomo                | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0005    |
| magnesio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.32      | 1.43      | 1.35      |
| manganeso            | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.089     | 0.101     | 0.07      |
| mercurio             | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno            | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel               | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0007    | 0.0005    |
| fósforo              | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.21      | 0.26      | 0.25      |
| selenio              | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0006    | < 0.0002  |
| silicio              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.83      | 6.48      | 4.29      |
| plata                | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.05      | 2.91      | 3.01      |
| estroncio            | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.019     | 0.013     | 0.012     |
| telurio              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño               | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | < 0.0002  | 0.0005    |
| uranio               | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| zinc                 | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017     | 0.011     | 0.011     |
| zirconio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W27 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 29.3    | 26.9    | 26      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.19    | 6.91    | 5.3     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 70      | 50      | 289     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 334     | 248     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.35    | 3.26    | 1.7     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.93    | 5.95    | 5.64    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 63      | 37      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13.7    | 7.5     | 11.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.3    | 8.3     | 11.3    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 31      | 23      | 51      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | 3       | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8.1     | 3.1     | 3.6     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.9     | 3.8     | 4.4     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07    | 0.07    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.96    | 3.24    | 3.99    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.8    | 7.94    | 13.2    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.1     | 1.6     | 2.3     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4       | 7       | 2       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0       | -       | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0       | -       | -       |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W27 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.04      | 0.033     |
| antimonio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.022     | 0.02      | 0.014     |
| berilio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.00006   | 0.00005   |
| calcio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.44      | 1.47      | 2.1       |
| cromo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0043    | 0.0003    |
| cobre                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0062    | 0.0049    |
| hierro                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.03      | < 0.01    |
| plomo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0008    | 0.0005    |
| magnesio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.85      | 0.94      | 1.48      |
| manganeso                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0084    | 0.084     | 0.016     |
| mercurio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0013    | 0.0007    |
| fósforo                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.28      | 0.29      | 0.21      |
| selenio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.28      | 4.64      | 4.84      |
| plata                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.7       | 2.59      | 3.1       |
| estroncio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.019     | 0.012     | 0.013     |
| telurio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0004    | < 0.0002  |
| uranio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| zinc                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.023     | 0.039     | 0.019     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W27 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.17      | 0.045     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.023     | 0.03      | 0.014     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.00008   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.51      | 1.63      | 2.08      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.0088    | 0.0033    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.16      | 0.02      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0009    | 0.0005    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.94      | 1.02      | 1.47      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.094     | 0.017     |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0006    | 0.0005    |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3       | 0.33      | 0.2       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.71      | 5.17      | 4.78      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.8       | 2.7       | 3.07      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.015     | 0.013     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0005    | 0.0002    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.037     | 0.016     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 26.3    | 24.4    | 23.4    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.05    | 7.56    | 7.46    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90      | 70      | 266     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 261     | 232     | 80      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | 0.33    | 1.07    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.74    | 7.4     | 7.65    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 79      | 60      | 68      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 23.3    | 19.9    | 20.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.8    | 19.9    | 21.4    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 78      | 52      | 60      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6       | 2       | 4       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 36.2    | 23.6    | 29.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44.2    | 28.8    | 36.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | 0.02    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.22    | 0.25    | 0.25    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.25    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.4     | 4.52    | 5.49    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.56    | 0.97    | 0.78    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 132     | < 20    | 12      |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | 3       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 500     | 0       | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 100     | 0       | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.004     | 0.008     | 0.007     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013     | 0.011     | 0.011     |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.01      | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.00009   | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.77      | 4.7       | 4.95      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | < 0.0002  | 0.005     |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0003    | 0.0012    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.01      | < 0.01    |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.16      | 1.99      | 1.96      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | < 0.0002  | 0.0082    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0007    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.74      | 0.81      | 0.69      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13        | 11.9      | 10        |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.41      | 4.13      | 4.14      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.053     | 0.04      | 0.043     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0008    | 0.0006    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016    | 0.0011    | 0.0011    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | 0.024     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.039     | 0.047     | 0.042     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.015     | 0.011     | 0.012     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | 0.0001    | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.09      | 4.66      | 5.15      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0005    | 0.0005    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04      | 0.03      | 0.05      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.58      | 2         | 2.07      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0035    | 0.0018    | 0.0049    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.73      | 0.78      | 0.69      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.1      | 11.8      | 10.2      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.04      | 4.03      | 4.24      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.057     | 0.039     | 0.044     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014    | 0.0017    | 0.0012    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016    | 0.0011    | 0.0013    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | < 0.001   | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 29.7    | 23.4 C  | 25.7    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.2     | 7       | 6.5     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90      | 50      | 211     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 260     | 180     | 40      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.55    | 0.68    | 0.71    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.41    | 6.93    | 7.39    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 56      | 40      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 16.2    | 11.6    | 10.1    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 18      | 11.5    | 10.2    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 32      | 44      | 36      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | < 1     | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 20.9    | 10.4    | 18.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.5    | 12.6    | 23      |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.1     | 0.09    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.09    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | < 0.2   | 0.2     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.14    | 4.26    | 4.41    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.42    | 3.09    | 2.96    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | < 0.2   | 0.2     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 10    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.7     | 1.3     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | 8       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 18,300  | -       | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8,300   | -       | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.017     | 0.019     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0066    | 0.0056    | 0.0058    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.25      | 2.68      | 2.42      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0044    | 0.0068    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0008    | 0.001     |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.02      | 0.05      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0003    |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.36      | 1.19      | 0.98      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0066    | 0.015     | 0.02      |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0007    | 0.0009    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.19      | 0.22      | 0.2       |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.75      | 4.55      | 2.8       |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.4       | 2.66      | 2.46      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.022     | 0.015     | 0.012     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0003    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.002     | 0.003     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.014     | 0.044     | 0.045     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0074    | 0.0059    | 0.0061    |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.58      | 2.64      | 2.39      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0005    | 0.0005    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07      | 0.07      | 0.08      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0003    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.6       | 1.19      | 1.01      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0037    | 0.0063    | 0.0085    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.28      | 0.24      | 0.2       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0007    | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.94      | 4.61      | 2.83      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.77      | 2.6       | 2.48      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.023     | 0.015     | 0.013     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0005    | 0.0003    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0002    | < 0.0002  |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.001     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 26.5    | 22.8    | 25.9    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.85    | 6.81    | 6.64    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 40      | 40      | 548     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 269     | 261     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.49    | 0.21    | 0.61    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.1     | 6.86    | 7.04    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 33      | 35      | 44      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.5     | 8.1     | 11.1    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8       | 8.6     | 11.1    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 24      | 26      | 26      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | < 1     | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 12.6    | 10.4    | 15.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 15.3    | 12.7    | 19.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04    | 0.05    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.64    | 4.81    | 5.68    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.25    | 0.96    | 0.88    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.2     | 1.6     | 1.2     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | 5       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9,300   | 6,800   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,700   | 1,200   | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.19      | 0.044     | 0.02      |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.006     | 0.0082    | 0.011     |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.39      | 1.59      | 2.29      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0048    | 0.0024    | 0.0015    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0008    | 0.0027    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.24      | 0.04      | 0.07      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0004    | 0.0007    |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.74      | 1         | 1.31      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0089    | 0.0051    | 0.0041    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0004    | 0.0004    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.34      | 0.4       |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.29      | 5.47      | 5.25      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.34      | 3.04      | 3.65      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.015     | 0.016     | 0.024     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008     | 0.0011    | 0.0005    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.0003    | 0.0003    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.002     | 0.002     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.11      | 0.075     | 0.03      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0077    | 0.0086    | 0.011     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.67      | 1.69      | 2.25      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014    | 0.0005    | 0.0008    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.2       | 0.08      | 0.09      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | 0.0006    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.93      | 1.05      | 1.33      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0019    | 0.0015    | 0.0023    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.38      | 0.4       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.35      | 5.87      | 5.19      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.53      | 3.28      | 3.64      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017     | 0.016     | 0.024     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0026    | 0.0013    | 0.0007    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.0004    | 0.0003    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.002     | 0.002     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W31 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27.6    | 22.8    | 25.9    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.7     | 6.74    | 6.91    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 40      | 30      | 533     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 269     | 258     | 40      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.07    | 0.66    | 0.71    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.97    | 6.8     | 7.1     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 29      | 30      | 40      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.8     | 5.1     | 8.8     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.3     | 6.2     | 8.4     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 15      | 25      | 40      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | 19      | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 10.4    | 8.7     | 12.4    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 12.7    | 10.6    | 15.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | 0.01    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.09    | 0.1     | 0.06    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.06    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | 0.003   |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.6     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.12    | 4       | 6.1     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.27    | 0.92    | 0.59    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.6     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.1     | 1.7     | 2.4     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2       | 4       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,200   | 400     | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2,400   | 0       | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |



Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W31 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.24      | 0.047     | 0.017     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0054    | 0.0058    | 0.0094    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.27      | 1.04      | 1.78      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | 0.0002    |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.0049    | 0.0009    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.011     | 0.035     | 0.029     |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.29      | 0.02      | 0.07      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0023    | 0.0025    |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0002    | 0.0004    |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.63      | 0.6       | 1.05      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0026    | 0.009     | 0.0022    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0012    | 0.0005    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.41      | 0.32      | 0.38      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.51      | 3.65      | 4.92      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.01      | 2.58      | 3.69      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.014     | 0.0093    | 0.018     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.009     | 0.0009    | 0.0006    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011    | 0.0002    | 0.0002    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.029     | 0.016     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W31 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.17      | 0.078     | 0.024     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008     | 0.0066    | 0.0088    |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.57      | 1.23      | 1.7       |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.011     | 0.038     | 0.013     |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.29      | 0.07      | 0.09      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.002     | 0.0009    |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0004    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.81      | 0.77      | 1.01      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0086    | 0.0008    | 0.0007    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4       | 0.35      | 0.36      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.57      | 4.59      | 4.65      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.31      | 2.86      | 3.6       |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016     | 0.012     | 0.017     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0026    | 0.002     | 0.0007    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | 0.0003    | 0.0003    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003     | 0.024     | 0.007     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W32 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 28.8    | 25.7    | 24.3    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.2     | 6.54    | 7.3     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 110     | 80      | 251     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 248     | 255     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.54    | 4.07    | 1.78    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.64    | 6.99    | 7.36    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 68      | 48      | 60      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 21.4    | 17      | 20.7    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 23.8    | 17.7    | 20.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 67      | 33      | 39      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 1     | < 1     | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 31.6    | 20.3    | 27.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 38.6    | 24.8    | 34      |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.6     | 0.17    | 0.2     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.2     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.38    | 2.42    | 4.26    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.8     | 0.94    | 0.54    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.6     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | < 2     | 2       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9,600   | 1,600   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,600   | 800     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W32 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.11      | 0.057     | 0.023     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0097    | 0.0086    | 0.0094    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | 0.01      |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.84      | 2.86      | 3.8       |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.0014    | 0.0011    |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0087    | 0.002     | 0.0005    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | 0.0054    | 0.0013    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.25      | 0.04      | 0.04      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.87      | 2.39      | 2.71      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016     | 0.0038    | 0.0012    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0013    | 0.0007    | 0.0003    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.74      | 0.81      | 0.48      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.28      | 9.03      | 7.56      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.36      | 2.17      | 2.85      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02      | 0.015     | 0.021     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.01      | 0.0024    | 0.0016    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0025    | 0.0008    | 0.0014    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.002     | 0.001     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W32 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/l     | 0.2                                                  | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.072     | 0.085     | 0.047     |
| antimonio     | mg/l     | 0.005                                                | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/l     | 0.01                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/l     | 0.7                                                  | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.011     | 0.0087    | 0.0096    |
| berilio       | mg/l     | 0.0146                                               | ornl                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/l     | 5                                                    | ccme                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/l     | 0.003                                                | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.99      | 2.99      | 3.74      |
| cromo         | mg/l     | 0.05                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | 0.0014    | 0.0013    |
| cobalto       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/l     | 1                                                    | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | 0.0029    | 0.0011    |
| hierro        | mg/l     | 0.3                                                  | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.1       | 0.08      | 0.07      |
| plomo         | mg/l     | 0.01                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/l     | 0.0146                                               | ornl                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.35      | 2.47      | 2.81      |
| manganeso     | mg/l     | 0.1                                                  | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011    | 0.0008    | 0.0007    |
| mercurio      | mg/l     | 0.001                                                | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/l     | 0.07                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/l     | 0.02                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0003    |
| fósforo       | mg/l     | 0.000146                                             | ornl                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.73      | 0.89      | 0.52      |
| selenio       | mg/l     | 0.01                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.58      | 9.4       | 7.52      |
| plata         | mg/l     | 0.05                                                 | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/l     | ≤ 200                                                | ccme                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.62      | 2.24      | 2.8       |
| estroncio     | mg/l     | 4.4                                                  | ornl                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.015     | 0.021     |
| telurio       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/l     | 4.4                                                  | ornl                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0028    | 0.0032    | 0.0027    |
| uranio        | mg/l     | 0.02                                                 | ccme                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.0009    | 0.0015    |
| zinc          | mg/l     | 5                                                    | p                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.002     | 0.001     |
| zirconio      | mg/l     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W33 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27.3    | 24.5C   | 24      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.4     | 7.6     | 7.6     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90      | 70      | 199     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 252     | 200     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.47    | 1.34    | 1.42    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.82    | 7.56    | 7.6     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 79      | 59      | 61      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.8    | 21.4    | 20.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 28.5    | 21.4    | 20.3    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 68      | 48      | 53      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8       | < 1     | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 42.2    | 25.6    | 30.6    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 51.4    | 31.2    | 37.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04    | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07    | 0.03    | 0.13    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.13    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.33    | 3.35    | 4.31    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | 0.631   | < 0.5   |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 10    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.1     | < 1     | 1.1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | 9       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8,700   | -       | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,000   | -       | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W33 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008     | 0.023     | 0.011     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0097    | 0.0078    | 0.0095    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.17      | 3.84      | 3.91      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0005    |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0004    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0006    | 0.001     |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.12      | 2.88      | 2.58      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0014    | 0.0012    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.27      | 0.29      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 10.3      | 11.3      | 7.68      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.97      | 3.08      | 3.21      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.025     | 0.024     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | 0.0011    | 0.0007    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0021    | 0.0012    | 0.0012    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.01      | 0.001     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W33 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.047     | 0.051     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.011     | 0.008     | 0.0099    |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.4       | 3.87      | 3.78      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0007    |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0005    | 0.0005    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04      | 0.03      | 0.06      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.64      | 2.84      | 2.64      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0033    | 0.0028    | 0.0064    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.38      | 0.27      | 0.26      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0008    | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 10.8      | 11.5      | 7.42      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | 0.001     | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.34      | 3.03      | 3.12      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.027     | 0.024     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | 0.00002   | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0026    | 0.0015    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.0013    | 0.0013    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | < 0.001   | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W34 |        |        |        |        |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 22.8    | 26.9    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 6.52    | 6.44    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 40      | 255     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 268     | 40      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -       | 1.69    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.08   | 6.83    | 7.08    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 38     | 33      | 37      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.9    | 9.1     | 10      |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 12.2   | 9.5     | 10      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 51     | 23      | 40      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 74     | 2       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 19     | 13.8    | 17      |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 23.2   | 16.8    | 20.7    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04   | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.08   | 0.08    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.9    | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.69   | 2.49    | 3.29    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.5   | < 0.5   |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.9    | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.3    | 1.7     | 1.1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3      | 3       | 3       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2    | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13,700 | 4,300   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,400  | 800     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | < 0.002 | < 0.002 |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W34 |        |        |        |        |        |        |        |         |          |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.024    | 0.029     | 0.017     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.027    | 0.024     | 0.028     |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.12     | 1.97      | 2.31      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0037    | 0.0007    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0019   | 0.0032    | 0.0015    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.16     | 0.12      | 0.1       |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0003    | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.11     | 1         | 1.02      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0021   | 0.0077    | 0.0028    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0005    | 0.0002    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.67     | 0.43      | 0.51      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.84     | 9.22      | 7.05      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.73     | 2.48      | 2.61      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.105    | 0.083     | 0.092     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0022   | 0.0019    | 0.0013    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | 0.0005    | 0.0003    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | 0.005     | 0.002     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W34 |        |        |        |        |        |        |        |         |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.73     | 0.069     | 0.045     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.061    | 0.025     | 0.029     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.57     | 2.06      | 2.25      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0045   | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0039   | 0.0019    | 0.0004    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.85     | 0.25      | 0.22      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006   | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | < 0.0002  | 0.0003    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.4      | 1.05      | 1.05      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.987    | 0.0034    | 0.0096    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.14     | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.72     | 0.45      | 0.5       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001    | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11       | 9.62      | 7.02      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.09     | 2.53      | 2.52      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.123    | 0.086     | 0.094     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0082   | 0.0023    | 0.002     |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0054   | 0.0006    | 0.0004    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.007    | 0.002     | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27      | 25      | 24      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.3     | 7.5     | 7.36    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 80      | 70      | 198     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 261     | 245     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.06    | 1.83    | 0.84    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.72    | 7.38    | 7.52    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 74      | 52      | 64      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 21.8    | 12.8    | 18.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 22.6    | 13.3    | 18.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 59      | 27      | 60      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 15      | 3       | 9       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 34.4    | 19.7    | 28.2    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 42      | 24      | 34.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.18    | 0.14    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.07    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.72    | 4.39    | 4.27    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.84    | 1.33    | 1.64    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | 0.3     | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.1     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3       | 4       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4,600   | 7,200   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,600   | 1,200   | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003     | 0.009     | 0.004     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.046     | 0.03      | 0.041     |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.31      | 4.08      | 6.14      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0033    | 0.0051    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0009    | 0.0005    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.86      | 0.63      | 0.79      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0061    | 0.0084    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | 0.0005    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.26      | 0.26      | 0.29      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.63      | 8.47      | 7.18      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.31      | 4.56      | 4.71      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.067     | 0.04      | 0.053     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0002    | 0.0003    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0002    | 0.0003    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.001     | 0.002     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.005     | 0.025     | 0.066     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.049     | 0.03      | 0.043     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.46      | 4.27      | 6.24      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0003    | 0.0003    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02      | 0.02      | 0.07      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0006    | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.96      | 0.65      | 0.81      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.0011    | 0.008     |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.26      | 0.29      | 0.3       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.78      | 8.62      | 7.33      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.88      | 4.73      | 4.74      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.069     | 0.041     | 0.055     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0004    | 0.0005    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0002    | 0.0004    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | < 0.001   | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27.5    | 25.6 C  | 25.6    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.1     | 6.65    | 6.47    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 60      | 40      | 212     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 247     | 201     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.15    | 2.92    | 1.79    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.07    | 6.67    | 6.83    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 53      | 40      | 44      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.8    | 8.8     | 21.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13.4    | 8.9     | 10      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 46      | 24      | 42      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | 1       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.6    | 15.1    | 20.4    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 31.3    | 18.4    | 24.9    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.09    | < 0.01  | 0.05    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07    | 0.12    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.09    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.5     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.61    | 3.29    | 3.63    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.58    | 0.64    | 0.55    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.7     | 1.1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4       | 4       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,000   | 1,100   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 200     | 400     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003     | 0.013     | 0.039     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.039     | 0.031     | 0.0081    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.22      | 2.18      | 3.61      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0016    |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0025    | 0.0009    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0008    | 0.0007    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.16      | 0.14      | 0.05      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.9       | 0.81      | 3.06      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.024     | 0.047     | 0.0045    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0003    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.71      | 0.55      | 0.41      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.01      | 8.5       | 8.82      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.61      | 3.52      | 2.61      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.02      | 0.019     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0003    | 0.0018    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | 0.0023    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.003     | < 0.001   |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |        |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08    | Feb-09    |           |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.028     | 0.023     | 0.019     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.047     | 0.032     | 0.039     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3.6       | 2.18      | 2.57      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.0002    | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.0006    | 0.0002    | 0.0003    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.21      | 0.19      | 0.33      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.0002    | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | 0.0003    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1.07      | 0.83      | 0.86      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.04      | 0.026     | 0.02      |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.05      | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2.25      | 0.55      | 0.56      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 9.21      | 8.85      | 7.17      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 4.68      | 3.6       | 3.6       |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.035     | 0.02      | 0.024     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.0007    | 0.0004    | 0.0007    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.0003    | 0.0002    | < 0.0002  |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.005     | 0.002     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W37 |        |        |        |        |        |        |        |         |        |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09  |         |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 27.7 C | 24.5    |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 8.12   | 7.02    |         |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 40     | 212     |         |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 197    | 40      |         |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1.89   | 1.35    |         |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 7.39   | 7.31    | 7.21    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 45     | 38      | 43      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 14.1   | 10.5    | 11.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 15.4   | 11.5    | 11.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 38     | 17      | 16      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 1    | 1       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 15.7   | 10.3    | 13.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 19.2   | 12.6    | 16.8    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.01 | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.11   | 0.11    | 0.11    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | -       | 0.11    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.2  | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3.48   | 4.06    | 4.67    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3.61   | 2.73    | 3.04    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <20    | < 20    | 12      |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1.9    | 2.7     | 1.4     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3      | < 2     | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 2    | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2,500  | 1,100   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1,000  | 500     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002 |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W37 |        |        |        |        |        |        |        |         |          |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.019    | 0.032     | 0.028     |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0057   | 0.0049    | 0.0058    |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.48     | 2.69      | 2.92      |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0013   | 0.002     | 0.0046    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008   | 0.001     | 0.0014    |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02     | < 0.01    | 0.05      |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | 0.0003    |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.3      | 0.91      | 1.06      |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0025   | 0.004     | 0.0082    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | 0.0003    | 0.0007    |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3      | 0.19      | 0.23      |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.71     | 3.46      | 2.67      |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.55     | 2.43      | 2.54      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.018    | 0.012     | 0.015     |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0002    | 0.0004    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0002    | 0.0002    |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | 0.01      | 0.006     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W37 |        |        |        |        |        |        |        |         |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.057    | 0.053     | 0.052     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0064   | 0.005     | 0.0061    |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.75     | 3         | 2.98      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008   | 0.0006    | 0.0008    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.08     | 0.04      | 0.08      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0003    | 0.0003    |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.46     | 0.98      | 1.09      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0023   | 0.0007    | 0.0011    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3      | 0.22      | 0.24      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009   | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.8      | 3.81      | 2.77      |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.79     | 2.54      | 2.62      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.019    | 0.013     | 0.015     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006   | 0.0004    | 0.0004    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0003    | 0.0003    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002    | 0.018     | 0.002     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W38 |        |        |        |        |        |        |        |         |        |        |           |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|-----------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09    |         |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |           |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 27.6 C | 25        |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 7.07   | 7.18      |         |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 80     | 206       |         |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 222    | 50        |         |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1.69   | 0.61      |         |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |           |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 7.61   | 7.2698849 | 7.56    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 67     | 52.5      | 61      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 22.2   | 14        | 17.1    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 22.4   | 14.7      | 17.1    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 58     | 37        | 61      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 1    | 5         | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 29.4   | 19.65     | 26.6    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 35.9   | 23.95     | 32.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5     | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5     | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |           |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.01 | < 0.01    | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.22   | 0.17      | 0.19    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | -         | 0.19    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002   | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.2  | < 0.2     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |           |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3.5    | 4.29      | 4.64    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.05  | < 0.05    | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2.99   | 1.41      | 1.65    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |           |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.2   | < 0.2     | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <20    | < 20      | 12      |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2      | 1.5       | 1.3     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3      | 3         | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 2    | < 2       | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.001 | < 0.001   | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2,100  | 1,550     | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 400    | 350       | -       |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W38 |        |        |        |        |        |        |        |         |          |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.004    | 0.01      | 0.008     |
| antimonio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.027    | 0.0335    | 0.039     |
| berilio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.12     | 4.525     | 5.65      |
| cromo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | 0.0026    |
| cobre                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016   | 0.0023    | 0.0018    |
| hierro                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| plomo                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.66     | 0.655     | 0.73      |
| manganeso                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.00055   | 0.0045    |
| mercurio                             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | 0.0004    |
| fósforo                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.36     | 0.28      | 0.36      |
| selenio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.39     | 8.305     | 6.41      |
| plata                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.14     | 4.47      | 4.37      |
| estroncio                            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.049    | 0.0435    | 0.05      |
| telurio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio                                | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | < 0.0002  | 0.0003    |
| uranio                               | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0002    | 0.0003    |
| zinc                                 | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | 0.0025    | 0.003     |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W38 |        |        |        |        |        |        |        |         |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.023    | 0.025     | 0.026     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.028    | 0.0325    | 0.038     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.04     | 4.77      | 5.61      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011   | 0.0028    | 0.0012    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02     | 0.015     | 0.03      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.78     | 0.675     | 0.74      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001    | 0.0008    | 0.0031    |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.34     | 0.29      | 0.34      |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009   | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.61     | 8.62      | 6.2       |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.67     | 4.69      | 4.3       |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.049    | 0.0425    | 0.051     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0003    | 0.0003    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | 0.0003    | 0.0003    |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001    | 0.004     | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W39 |        |        |        |        |        |        |        |         |        |        |         |           |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|---------|-----------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09  |           |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 26.3   | 27.8    |           |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 7.3    | 7.5     |           |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 70     | 188     |           |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 227    | NA      |           |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.29   | 0.81    |           |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 7.76   | 7.4     | 7.5889647 |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 79     | 61      | 71.5      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 25.6   | 19.8    | 21.95     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 26.7   | 20.1    | 21.65     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 61     | 42      | 62.5      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 2      | < 1     | < 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 35.2   | 23.7    | 31.85     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 43     | 28.9    | 38.8      |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5   | < 0.5     |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.5  | < 0.5   | < 0.5     |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.01 | < 0.01  | 0.01      |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.38   | 0.23    | 0.19      |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | -       | 0.19      |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002   |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 0.2  | < 0.2   | < 0.2     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 5.35   | 4.72    | 5.65      |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.05  | < 0.05  | < 0.05    |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 0.76   | 1.04    | 0.63      |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.2   | < 0.2   | < 0.2     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <20    | < 20    | < 10      |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1.6    | 1.4     | < 1       |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 4      | 3       | < 2       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | < 2    | < 2     | < 2       |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.001 | < 0.001 | < 0.001   |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 3,000  | 800     | -         |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | 1,800  | 200     | -         |
| Especies de Cianuro                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |        |         |           |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002   |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | <0.002 | < 0.002 | < 0.002   |



Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W39 |        |        |        |        |        |        |        |         |          |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008    | 0.018     | 0.0055    |
| antimonio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.014    | 0.011     | 0.011     |
| berilio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | 0.00013   | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.06     | 4.77      | 5.415     |
| cromo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | 0.0004    |
| cobre             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0006    | 0.00185   |
| hierro            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| plomo             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | 0.0002    |
| litio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.54     | 1.92      | 2.035     |
| manganeso         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0002    | 0.0006    |
| mercurio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.84     | 0.8       | 0.705     |
| selenio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13.9     | 11.6      | 10.65     |
| plata             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.07     | 4         | 4.38      |
| estroncio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.057    | 0.041     | 0.0455    |
| telurio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio             | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008   | 0.001     | 0.0004    |
| uranio            | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015   | 0.0011    | 0.00115   |
| zinc              | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | 0.002     | 0.005     |
| zirconio          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W39 |        |        |        |        |        |        |        |         |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.076    | 0.029     | 0.026     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016    | 0.011     | 0.012     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | 0.00012   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.01     | 4.8       | 5.29      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011   | 0.0006    | 0.0016    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07     | 0.02      | 0.025     |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.83     | 1.97      | 2.05      |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008    | 0.0011    | 0.00275   |
| mercurio      | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.81     | 0.8       | 0.675     |
| selenio       | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001    | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.3     | 12.2      | 10.55     |
| plata         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.59     | 4.17      | 4.335     |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.056    | 0.04      | 0.045     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | < 0.00002 | < 0.00002 |
| torio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0022   | 0.0011    | 0.00105   |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015   | 0.0011    | 0.00125   |
| zinc          | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003    | 0.002     | 0.003     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | < 0.002   | < 0.002   |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |        |          |           |            |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|----------|-----------|------------|--------|
|                                                               |                                         |                                                      |                      | Mínimo                     | Máximo | Media    | Promedio  | Desv. Est. | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |          |           |            |        |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 22.8                       | 29.7   | 25.7     | 25.878947 | 1.8399703  | 38     |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 5                          | 8.12   | 7.035    | 6.3       | -          | 44     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 30                         | 548    | 80       | 140.81395 | 120.57012  | 43     |
| redox                                                         | mV                                      |                                                      |                      | 30                         | 334    | 229.5    | 183.5     | 98.613621  | 42     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | 0.21                       | 4.54   | 1.15     | 1.4369767 | 1.1163323  | 43     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |          |           |            |        |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 5.5                        | 7.82   | 7.289942 | 6.581541  | -          | 48     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 29                         | 98     | 52       | 53.4375   | 15.119603  | 48     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 5.1                        | 34.9   | 14.05    | 15.338542 | 6.2846168  | 48     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 6.2                        | 37.2   | 14.5     | 15.830208 | 6.5797864  | 48     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 15                         | 90     | 42       | 42.822917 | 17.088471  | 48     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | <1                         | 74     | 1        | 4.03125   | 10.938127  | 48     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 2.8                        | 50.6   | 19.675   | 20.370833 | 10.776229  | 48     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 3.5                        | 61.7   | 23.975   | 24.855208 | 13.139907  | 48     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | <0.5                       | <0.5   | -        | -         | -          | 48     |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | <0.5                       | <0.5   | -        | -         | -          | 48     |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |          |           |            |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | <0.01                      | 0.09   | <0.01    | 0.01      | 0.0152984  | 48     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.02                       | 0.6    | 0.1      | 0.12875   | 0.1017846  | 48     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.04                       | 0.25   | 0.095    | 0.10875   | 0.0661186  | 16     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | <0.002                     | 0.003  | <0.002   | <0.002    | 0.0002887  | 48     |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | <0.2                       | 0.9    | <0.2     | <0.2      | 0.1597316  | 48     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |          |           |            |        |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.42                       | 6.1    | 4.035    | 4.079375  | 0.790444   | 48     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | <0.05                      | 0.05   | <0.05    | <0.05     | 0.0036084  | 48     |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | <0.5                       | 17.8   | 0.965    | 2.6921042 | 4.0918702  | 48     |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |          |           |            |        |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | <0.2                       | 0.9    | <0.2     | <0.2      | 0.1559545  | 48     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | <10                        | 132    | 10       | 14.520833 | 24.93224   | 48     |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | <1                         | 7.1    | 1.25     | 1.425     | 1.1501156  | 48     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | <2                         | 26     | 3        | 3.625     | 4.0665998  | 48     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |          |            |            |        |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|----------|----------|------------|------------|--------|
|                                      |           |                                                      |                      | Mínimo                     | Máximo   | Media    | Promedio   | Desv. Est. | Conteo |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | <2                         | <4       | -        | -          | -          | 48     |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | <0.001                     | <0.001   | -        | -          | -          | 48     |
| coliformes totales                   | CFU/100mL |                                                      |                      | 0                          | 18,300   | 23,00    | 3,873.2143 | 4,528.1932 | 28     |
| coliformes fecales                   | CFU/100mL |                                                      |                      | 0                          | 8,300    | 650      | 1,151.7857 | 1,708.6643 | 28     |
| <b>Especies de Cianuro</b>           |           |                                                      |                      |                            |          |          |            |            |        |
| cianuro total                        | mg/L      | 0.001                                                | P                    | <0.002                     | <0.002   | -        | -          | -          | 48     |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | <0.002                     | <0.002   | -        | -          | -          | 48     |
| <b>Metales Disueltos</b>             |           |                                                      |                      |                            |          |          |            |            |        |
| aluminio                             | mg/L      |                                                      |                      | <0.001                     | 0.24     | 0.017    | 0.0334688  | 0.0483294  | 48     |
| antimonio                            | mg/L      |                                                      |                      | <0.0002                    | 0.0003   | <0.0002  | <0.0002    | 3.713E-05  | 48     |
| arsénico                             | mg/L      |                                                      |                      | <0.0002                    | 0.0002   | <0.0002  | <0.0002    | 2.019E-05  | 48     |
| bario                                | mg/L      |                                                      |                      | 0.0049                     | 0.046    | 0.011    | 0.0158438  | 0.0107786  | 48     |
| berilio                              | mg/L      |                                                      |                      | <0.0002                    | <0.0002  | -        | -          | -          | 48     |
| bismuto                              | mg/L      |                                                      |                      | <0.0002                    | <0.0002  | -        | -          | -          | 48     |
| boro                                 | mg/L      |                                                      |                      | <0.01                      | 0.01     | <0.01    | <0.01      | 0.0010097  | 48     |
| cadmio                               | mg/L      |                                                      |                      | <0.00004                   | 0.00013  | <0.00004 | <0.00004   | 2.484E-05  | 48     |
| calcio                               | mg/L      |                                                      |                      | 1.04                       | 8.57     | 3.35     | 3.575625   | 1.6987382  | 48     |
| cromo                                | mg/L      |                                                      |                      | <0.0002                    | 0.002    | <0.0002  | 0.0003188  | 0.0004671  | 48     |
| cobalto                              | mg/L      |                                                      |                      | <0.0002                    | 0.0087   | 0.00095  | 0.0019563  | 0.0021836  | 48     |
| cobre                                | mg/L      |                                                      |                      | 0.0002                     | 0.035    | 0.0012   | 0.003001   | 0.0064332  | 48     |
| hierro                               | mg/L      |                                                      |                      | <0.01                      | 0.29     | 0.015    | 0.0473958  | 0.069282   | 48     |
| plomo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0025   | <0.0002  | 0.0002458  | 0.0004776  | 48     |
| litio                                | mg/L      |                                                      |                      | <0.0002                    | 0.0008   | <0.0002  | <0.0002    | 0.0001725  | 48     |
| magnesio                             | mg/L      |                                                      |                      | 0.6                        | 3.28     | 1.315    | 1.55375    | 0.7559336  | 48     |
| manganeso                            | mg/L      |                                                      |                      | <0.0002                    | 0.085    | 0.00405  | 0.0123885  | 0.0219697  | 48     |
| mercurio                             | mg/L      |                                                      |                      | <0.00002                   | <0.00002 | -        | -          | -          | 48     |
| molibdeno                            | µg/L      |                                                      |                      | <0.0001                    | <0.0001  | -        | -          | -          | 48     |
| níquel                               | mg/L      |                                                      |                      | <0.0002                    | 0.0013   | 0.0003   | 0.0003938  | 0.0003354  | 48     |
| fósforo                              | mg/L      |                                                      |                      | <0.03                      | 0.06     | <0.03    | <0.03      | 0.0064952  | 48     |
| potasio                              | mg/L      |                                                      |                      | 0.19                       | 0.84     | 0.365    | 0.4215625  | 0.1976461  | 48     |
| selenio                              | mg/L      |                                                      |                      | <0.0002                    | 0.0005   | <0.0002  | <0.0002    | 8.078E-05  | 48     |
| silicio                              | mg/L      |                                                      |                      | 2.67                       | 16.9     | 7.655    | 7.7286458  | 3.1419283  | 48     |

Tabla 9 Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |          |           |            |        |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|----------|----------|-----------|------------|--------|
|               |          |                                                      |                      | Mínimo                     | Máximo   | Media    | Promedio  | Desv. Est. | Conteo |
| plata         | mg/L     |                                                      |                      | <0.00005                   | <0.00005 | -        | -         | -          | 48     |
| sodio         | mg/L     |                                                      |                      | 2.01                       | 5.07     | 3.22     | 3.3533333 | 0.8203018  | 48     |
| estroncio     | mg/L     |                                                      |                      | 0.0093                     | 0.105    | 0.0245   | 0.0329438 | 0.0223474  | 48     |
| telurio       | mg/L     |                                                      |                      | <0.0002                    | <0.0002  | -        | -         | -          | 48     |
| talio         | mg/L     |                                                      |                      | <0.00002                   | <0.00002 | -        | -         | -          | 48     |
| toro          | mg/L     |                                                      |                      | <0.0001                    | <0.0001  | -        | -         | -          | 48     |
| estaño        | mg/L     |                                                      |                      | <0.0002                    | <0.0002  | -        | -         | -          | 48     |
| titanio       | mg/L     |                                                      |                      | <0.0002                    | 0.01     | 0.00055  | 0.0012917 | 0.0021418  | 48     |
| uranio        | mg/L     |                                                      |                      | <0.0001                    | <0.0001  | -        | -         | -          | 48     |
| vanadio       | mg/L     |                                                      |                      | <0.0002                    | 0.0051   | 0.00045  | 0.0008469 | 0.0009413  | 48     |
| zinc          | mg/L     |                                                      |                      | <0.001                     | 0.039    | 0.002    | 0.0058646 | 0.0085345  | 48     |
| zirconio      | mg/L     |                                                      |                      | <0.002                     | <0.002   | -        | -         | -          | 48     |
| Total Metales |          |                                                      |                      |                            |          |          |           |            |        |
| aluminio      | mg/L     | 0.2                                                  | P                    | <0.001                     | 0.73     | 0.045    | 0.0681771 | 0.1050735  | 48     |
| antimonio     | mg/L     | 0.005                                                | P                    | <0.0002                    | <0.0002  | -        | -         | -          | 48     |
| arsénico      | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.0005   | <0.0002  | <0.0002   | 8.833E-05  | 48     |
| bario         | mg/L     | 0.7                                                  | P                    | 0.005                      | 0.061    | 0.0125   | 0.0181521 | 0.0133164  | 48     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | <0.0002  | -        | -         | -          | 48     |
| bismuto       | mg/L     |                                                      |                      | <0.0002                    | <0.0002  | -        | -         | -          | 48     |
| boro          | mg/L     | 5                                                    | CCME                 | <0.01                      | <0.01    | -        | -         | -          | 48     |
| cadmio        | mg/L     | 0.003                                                | P                    | <0.00004                   | 0.00012  | <0.00004 | <0.00004  | 2.366E-05  | 48     |
| calcio        | mg/L     |                                                      |                      | 1.23                       | 8.61     | 3.24     | 3.6491667 | 1.7026573  | 48     |
| cromo         | mg/L     | 0.05                                                 | P                    | <0.0002                    | 0.0016   | <0.0002  | 0.0002833 | 0.0003937  | 48     |
| cobalto       | mg/L     |                                                      |                      | <0.0002                    | 0.0045   | <0.0002  | 0.0002896 | 0.000745   | 48     |
| cobre         | mg/L     | 1                                                    | P                    | 0.0002                     | 0.038    | 0.0008   | 0.0027208 | 0.0060386  | 48     |
| hierro        | mg/L     | 0.3                                                  | P                    | <0.01                      | 5.85     | 0.07     | 0.2064583 | 0.8353608  | 48     |
| plomo         | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.002    | <0.0002  | 0.0002104 | 0.000336   | 48     |
| litio         | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | 0.0009   | <0.0002  | 0.0002083 | 0.0001773  | 48     |
| magnesio      | mg/L     |                                                      |                      | 0.65                       | 3.8      | 1.375    | 1.6273958 | 0.8175469  | 48     |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.0002                     | 0.987    | 0.002775 | 0.0324469 | 0.1428473  | 48     |
| mercurio      | mg/L     | 0.001                                                | P                    | <0.00002                   | <0.00002 | -        | -         | -          | 48     |
| molibdeno     | mg/L     | 0.07                                                 | P                    | <0.0001                    | <0.0001  | -        | -         | -          | 48     |

Tabla 9      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |         |          |           |            |        |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|---------|----------|-----------|------------|--------|
|           |          |                                                      |                      | Mínimo                     | Máximo  | Media    | Promedio  | Desv. Est. | Conteo |
| níquel    | mg/L     | 0.02                                                 | P                    | <0.0002                    | 0.0007  | <0.0002  | <0.0002   | 0.0001637  | 48     |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | <0.03                      | 0.14    | <0.03    | <0.03     | 0.0195696  | 48     |
| potasio   | mg/L     |                                                      |                      | 0.2                        | 2.25    | 0.365    | 0.4628125 | 0.325251   | 48     |
| selenio   | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.001   | <0.0002  | 0.0002083 | 0.0002704  | 48     |
| silicio   | mg/L     |                                                      |                      | 2.77                       | 18      | 7.745    | 7.9552083 | 3.3256815  | 48     |
| plata     | mg/L     | 0.05                                                 | P                    | <0.00005                   | 0.001   | <0.00005 | <0.00005  | 0.0001407  | 48     |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 2.24                       | 5.59    | 3.38     | 3.5540625 | 0.918182   | 48     |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.012                      | 0.123   | 0.0245   | 0.0341563 | 0.0237514  | 48     |
| telurio   | mg/L     |                                                      |                      | <0.0002                    | <0.0002 | -        | -         | -          | 48     |
| talio     | mg/L     |                                                      |                      | <0.00002                   | 0.00002 | <0.00002 | <0.00002  | 1.443E-06  | 48     |
| toro      | mg/L     |                                                      |                      | <0.0001                    | <0.0001 | -        | -         | -          | 48     |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | <0.0002                    | 0.0003  | <0.0002  | <0.0002   | 3.472E-05  | 48     |
| titanio   | mg/L     |                                                      |                      | <0.0002                    | 0.0082  | 0.00085  | 0.0013656 | 0.0014256  | 48     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | <0.0001                    | <0.0001 | -        | -         | -          | 48     |
| vanadio   | mg/L     |                                                      |                      | <0.0002                    | 0.0054  | 0.0004   | 0.000926  | 0.0011047  | 48     |
| zinc      | mg/L     | 5                                                    | P                    | <0.001                     | 0.037   | 0.002    | 0.0049896 | 0.0075488  | 48     |
| zirconio  | mg/L     |                                                      |                      | <0.002                     | <0.002  | -        | -         | -          | 48     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla – Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos se utilizó un valor de la mitad del límite de detección.

<sup>(c)</sup> P: Reglamento panameño 351 Concentraciones máximas permisibles en el agua potable (1999); AO: Objetivo estético.

0.3 - denota una excedencia por encima de los criterios asociados a la salud humana.

CCME: Consejo Canadiense de Ministros del Medio Ambiente, Lineamientos Canadienses para la Salud Humana para la Calidad del Agua Potable en Canadá (2008); ORNL: Niveles de análisis del agua del grifo del Oak Ridge National Laboratory para contaminantes químicos en sitios del Superfondo (lineamientos ajustados para reflejar un ILCR de 10-5, HQ de 0.2) (Septiembre 2008).

Tabla 10 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W15 |         |        |         |         |        |        |        |         |           |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|--------|---------|---------|--------|--------|--------|---------|-----------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |         |           |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | 26      | -      | 24.4    | 28.5    | -      | -      | 26.6   | 28.5    | 28.6      | 23.2    | 25.1    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                        | -       | -      | -       | 8.1     | -      | -      | 7.2    | 7.64    | 8         | 7.25    | 7.26    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 50      | -      | 60      | 80      | -      | -      | 70     | -       | 90        | 30      | 447     |
| redox                                                         | mV                                      |                                                      |                      | -                          | 175     | -      | 127     | -       | -      | -      | 146    | -       | 243       | 242     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -      | 45      | -       | -      | -      | 6.13   | -       | 2.11      | 37.3    | 7.93    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |         |           |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | 7.28    | -      | 6.61    | 7.44    | -      | -      | 7.38   | 7.75    | 7.7149712 | 6.78    | 7.46    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 49      | -      | 52      | 73      | -      | -      | 70     | 75      | 75.5      | 28      | 59      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 16      | -      | 14      | 22      | -      | -      | 21     | 28      | 23.3      | 7.5     | 18      |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 16      | -      | 15      | 21      | -      | -      | 24     | 24      | 26.4      | 9.2     | 18      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | 61      | -      | 33      | 66      | -      | -      | 74     | 65      | 65        | 19      | 52      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | 30      | -      | 35      | 2       | -      | -      | 7      | 1       | 2         | 71      | 13      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | 18.2    | -      | 19.1    | 23.7    | -      | -      | 20.5   | 30      | 32.55     | 9.1     | 23.2    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | 22.2    | -      | 23.2    | 28.9    | -      | -      | 25     | 36.6    | 39.7      | 11.1    | 28.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5     | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5     | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |         |           |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | -      | -      | 0.02   | 0.02    | 0.01      | 0.02    | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | 0.08    | -      | 0.14    | < 0.05  | -      | -      | 0.06   | < 0.05  | 0.02      | 0.13    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | 0.08    | -      | 0.14    | < 0.05  | -      | -      | 0.06   | < 0.05  | -         | -       | 0.08    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | < 0.002   | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | 0.4     | -      | 0.5     | < 0.2   | -      | -      | 0.3    | < 0.2   | < 0.2     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |         |           |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | 2.99    | -      | 3.62    | 4.25    | -      | -      | 3.79   | 3.84    | 3.66      | 2.05    | 4.57    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | < 0.05  | -      | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | < 0.05    | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | 2.05    | -      | 2.28    | 3.36    | -      | -      | 6.16   | 3.81    | 4.58      | 2.14    | 2.88    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |         |           |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                          | 0.4     | -      | 0.5     | < 0.2   | -      | -      | 0.3    | < 0.2   | < 0.2     | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                          | < 20    | -      | < 20    | 41      | -      | -      | 31     | < 20    | < 20      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                          | 2.6     | -      | 2.6     | 1.2     | -      | -      | 2.8    | 1.2     | 2.7       | 2.6     | 1.4     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                          | < 2     | -      | < 2     | < 2     | -      | -      | 4      | < 2     | 4         | 3       | < 2     |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W15 |           |        |           |           |        |        |           |           |           |           |           |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                                      |           |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | -                          | < 2       | -      | < 2       | < 2       | -      | -      | < 2       | < 2       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | -                          | -         | -      | < 0.001   | -         | -      | -      | < 0.001   | < 0.001   | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL |                                                      |                      | -                          | -         | -      | -         | -         | -      | -      | 11100     | 3100      | 5300      | 17600     | -         |
| coliformes fecales                   | CFU/100mL |                                                      |                      | -                          | -         | -      | -         | -         | -      | -      | 3300      | 2800      | 2350      | 2500      | -         |
| <b>Especies de Cianuro</b>           |           |                                                      |                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| cianuro total                        | mg/L      | 0.001                                                | P                    | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Disueltos</b>             |           |                                                      |                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| aluminio                             | mg/L      |                                                      |                      | -                          | 0.18      | -      | 0.13      | 0.024     | -      | -      | 0.039     | 0.026     | 0.0165    | 0.18      | 0.052     |
| antimonio                            | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L      |                                                      |                      | -                          | 0.014     | -      | 0.014     | 0.018     | -      | -      | 0.018     | 0.022     | 0.0195    | 0.0098    | 0.017     |
| berilio                              | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L      |                                                      |                      | -                          | < 0.05    | -      | < 0.05    | 0.05      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L      |                                                      |                      | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00017   | < 0.00004 |
| calcio                               | mg/L      |                                                      |                      | -                          | 3.97      | -      | 3.63      | 5.27      | -      | -      | 5.41      | 6.89      | 6.13      | 1.84      | 4.45      |
| cromo                                | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    |
| cobalto                              | mg/L      |                                                      |                      | -                          | 0.003     | -      | 0.002     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0007    | 0.0047    | 0.0022    |
| cobre                                | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.00065   | 0.0018    | 0.002     |
| hierro                               | mg/L      |                                                      |                      | -                          | 0.2       | -      | 0.2       | 0.1       | -      | -      | 0.11      | 0.14      | 0.125     | 0.16      | 0.13      |
| plomo                                | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L      |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L      |                                                      |                      | -                          | 1.55      | -      | 1.28      | 2.08      | -      | -      | 1.93      | 2.57      | 1.94      | 0.71      | 1.68      |
| manganeso                            | mg/L      |                                                      |                      | -                          | 0.014     | -      | 0.005     | 0.01      | -      | -      | 0.01      | 0.009     | 0.00765   | 0.02      | 0.016     |
| mercurio                             | mg/L      |                                                      |                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L      |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L      |                                                      |                      | -                          | 0.002     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0008    | 0.0005    |
| fósforo                              | mg/L      |                                                      |                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |



Tabla 10

Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)  
(continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W15 |           |        |           |           |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| potasio       | mg/L     |                                                      |                      | -                          | 0.8       | -      | 0.8       | 0.7       | -      | -      | 0.8       | 0.8       | 0.85      | 0.56      | 0.74      |
| selenio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | 7         | -      | 5.6       | 7.7       | -      | -      | 7.4       | 10        | 8.72      | 4.64      | 6.89      |
| plata         | mg/L     |                                                      |                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | 3.34      | -      | 3.21      | 4.03      | -      | -      | 3.83      | 5.14      | 3.78      | 2.02      | 3.88      |
| estroncio     | mg/L     |                                                      |                      | -                          | 0.029     | -      | 0.027     | 0.041     | -      | -      | 0.039     | 0.052     | 0.05      | 0.014     | 0.035     |
| telurio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | 0.005     | -      | 0.005     | < 0.001   | -      | -      | 0.001     | 0.001     | 0.00105   | 0.0071    | 0.0016    |
| uranio        | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | 0.001     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.001     | 0.0012    | 0.0009    | 0.0008    |
| zinc          | mg/L     |                                                      |                      | -                          | < 0.005   | -      | < 0.005   | 0.005     | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | 0.54      | -      | 0.86      | 0.077     | -      | -      | 1.7       | 0.038     | 0.0455    | 1.01      | 0.22      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | 0.02      | -      | 0.027     | 0.017     | -      | -      | 0.022     | 0.021     | 0.0215    | 0.024     | 0.02      |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | < 0.05    | -      | < 0.05    | 0.05      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00011   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | 3.85      | -      | 3.75      | 4.99      | -      | -      | 5.92      | 6.18      | 6.63      | 2.13      | 4.37      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0005    | 0.0002    |
| cobalto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0012    | 0.0003    |
| cobre         | mg/L     | 1                                                    | P                    | -                          | 0.003     | -      | 0.004     | 0.001     | -      | -      | 0.001     | < 0.001   | 0.0008    | 0.0046    | 0.0013    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | 0.62      | -      | 1.24      | 0.2       | -      | -      | 0.36      | 0.21      | 0.22      | 1.07      | 0.47      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |

Tabla 10

Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)  
(continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W15 |           |        |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | 0.0002    |
| magnesio  | mg/L     |                                                      |                      | -                          | 1.51      | -      | 1.4       | 1.96      | -      | -      | 2.12      | 2.12      | 2.385     | 0.93      | 1.72      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | 0.033     | -      | 0.086     | 0.011     | -      | -      | 0.025     | 0.009     | 0.0108    | 0.074     | 0.026     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | 0.9       | -      | 0.9       | 0.7       | -      | -      | 0.9       | 0.7       | 0.885     | 0.64      | 0.73      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | 0.001     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | 7         | -      | 5.9       | 7.5       | -      | -      | 8         | 8.4       | 9.665     | 5.54      | 7.07      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | 3.17      | -      | 3.05      | 3.91      | -      | -      | 4.06      | 4.49      | 4.545     | 2.04      | 3.87      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | 0.029     | -      | 0.029     | 0.039     | -      | -      | 0.043     | 0.048     | 0.054     | 0.018     | 0.037     |
| telurio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | 0.006     | -      | 0.011     | 0.002     | -      | -      | 0.004     | 0.002     | 0.00115   | 0.017     | 0.0055    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | 0.002     | -      | 0.004     | 0.001     | -      | -      | 0.001     | 0.001     | 0.00125   | 0.0035    | 0.0016    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | 0.0015    | 0.015     | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.09    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W16 |         |        |         |           |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|--------|---------|-----------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08    | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |        |         |           |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | 26.7    | -      | 24.2    | 27.5      | 29     | -      | 27.1   | 29.1    | 29.4   | 23.9    | 26.2    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                        | 6.61    | -      | 7.1     | 7.2       | 6.69   | -      | -      | 7.35    | 7.6    | 6.95    | 7.08    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 1,010   | -      | 70      | 640       | 71     | -      | 68     | -       | 3,920  | 50      | 458     |
| redox                                                         | mV                                      |                                                      |                      | -                          | 194     | -      | 128     | -         | 990?   | -      | 144    | -       | 228    | 249     | 270     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -      | 20.6    | -         | 4.16   | -      | 10.22  | -       | 3.98   | 99      | 3.39    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |        |         |           |        |        |        |         |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | 7.43    | -      | 6.72    | 6.9798849 | 7.61   | -      | 7.13   | 7.55    | 7.64   | 6.81    | 7.44    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 1,070   | -      | 67      | 554       | 973    | -      | 1,490  | 3,370   | 3,560  | 39      | 240     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 112     | -      | 19      | 59.5      | 112    | -      | 123    | 316     | 329    | 8.1     | 34.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 106     | -      | 18      | 59.5      | 107    | -      | 130    | 347     | 331    | 11.8    | 34.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | 581     | -      | 39      | 270.5     | 523    | -      | 739    | 1,810   | 1,760  | 21      | 138     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | 16      | -      | 17      | 4         | 4      | -      | 76     | 10      | 4      | 268     | 7       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | 23.7    | -      | 22.1    | 34.7      | 38.3   | -      | 21.4   | 36.2    | 42.5   | 10.6    | 27.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | 28.9    | -      | 27      | 42.3      | 46.8   | -      | 26.2   | 44.1    | 51.8   | 13      | 33.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5     | < 0.5  | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5     | < 0.5  | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |        |         |           |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | < 0.01  | -      | < 0.01  | 0.02      | 0.02   | -      | 0.09   | 0.04    | 0.05   | 0.05    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | < 0.05  | -      | 0.08    | 0.05      | 0.01   | -      | < 0.25 | 0.05    | 0.02   | 0.12    | 0.06    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | < 0.1   | -      | 0.08    | 0.05      | 0.01   | -      | < 0.25 | 0.05    | -      | -       | 0.06    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | < 0.002 | -      | < 0.002 | < 0.002   | 0.002  | -      | <0.002 | 0.003   | 0.004  | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | 0.4     | -      | 0.2     | < 0.2     | 0.4    | -      | 0.8    | < 0.2   | 0.5    | 0.8     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |        |         |           |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | 304     | -      | 5.99    | 142       | 249    | -      | 384    | 956     | 972    | 4.57    | 53.8    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | < 0.1   | -      | 0.05    | < 0.05    | < 0.1  | -      | < 0.25 | < 0.05  | < 0.5  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | 40.4    | -      | 2.02    | 19.65     | 34.6   | -      | 52.5   | 136     | 124    | 2.09    | 8.47    |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W16 |          |        |          |          |          |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|----------|--------|----------|----------|----------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08   | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | 0.4      | -      | 0.2      | < 0.2    | 0.4      | -      | 0.7      | < 0.2    | 0.4       | 0.8       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | 23       | -      | 297      | 24       | < 20     | -      | 45       | < 20     | 187       | 72        | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | 4.1      | -      | 1.7      | 1.3      | 1.5      | -      | 5.9      | 1.5      | 1.6       | 2.3       | 1.4       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | 2        | -      | 4        | < 2      | 8         | 3         | 2         |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | 0.011    | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -        | -      | -        | 9,200    | 13,800    | 28,000    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -        | -      | -        | 2,400    | 5,300     | 2,800     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | 0.15     | -      | 0.094    | 0.041    | < 0.005  | -      | 0.17     | 0.021    | 0.01      | 0.26      | 0.037     |
| antimonio                            | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | 0.0002    | 0.0003    |
| arsénico                             | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | 0.003    | 0.0007    | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | 0.025    | -      | 0.017    | 0.0235   | 0.027    | -      | 0.029    | 0.035    | 0.028     | 0.013     | 0.02      |
| berilio                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | 0.07     | -      | < 0.05   | < 0.05   | 0.06     | -      | 0.09     | 0.22     | 0.16      | < 0.01    | 0.02      |
| cadmio                               | mg/L        |                                                      |                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | 10.7     | -      | 4.5      | 8.105    | 11.7     | -      | 11.1     | 24.6     | 25.2      | 1.85      | 5.85      |
| cromo                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | 0.0007    | < 0.0002  | 0.0003    |
| cobalto                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | 0.004    | 0.004    | < 0.001  | -      | < 0.001  | < 0.001  | 0.002     | 0.0031    | 0.0061    |
| cobre                                | mg/L        |                                                      |                      | -                          | 0.001    | -      | < 0.001  | < 0.001  | < 0.001  | -      | 0.002    | 0.001    | 0.0009    | 0.0019    | 0.0015    |
| hierro                               | mg/L        |                                                      |                      | -                          | 0.17     | -      | 0.19     | 0.115    | 0.09     | -      | 0.65     | 0.07     | 0.02      | 0.23      | 0.19      |
| plomo                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | 0.0006    |
| litio                                | mg/L        |                                                      |                      | -                          | 0.002    | -      | < 0.001  | < 0.001  | 0.002    | -      | 0.004    | 0.008    | 0.0062    | < 0.0002  | 0.0005    |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W16 |           |        |           |           |           |        |           |           |           |           |           |
|----------------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|                      |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio             | mg/L     |                                                      |                      | -                          | 20.6      | -      | 1.78      | 9.57      | 20        | -      | 23.3      | 61.7      | 64.5      | 0.85      | 4.83      |
| manganeso            | mg/L     |                                                      |                      | -                          | 0.055     | -      | 0.033     | 0.0445    | 0.046     | -      | 0.073     | 0.099     | 0.062     | 0.04      | 0.037     |
| mercurio             | mg/L     |                                                      |                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno            | µg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0006    | 0.0006    | < 0.0001  | < 0.0001  |
| níquel               | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0004    | 0.0005    | 0.0008    |
| fósforo              | mg/L     |                                                      |                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio              | mg/L     |                                                      |                      | -                          | 6.6       | -      | 0.9       | 3.1       | 6.3       | -      | 7.6       | 19.2      | 19        | 0.77      | 1.82      |
| selenio              | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio              | mg/L     |                                                      |                      | -                          | 9         | -      | 8         | 8.05      | 11.3      | -      | 7         | 9.1       | 10.5      | 5.81      | 7.83      |
| plata                | mg/L     |                                                      |                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                | mg/L     |                                                      |                      | -                          | 163       | -      | 4.98      | 71.4      | 148       | -      | 181       | 519       | 513       | 3.69      | 29.8      |
| estroncio            | mg/L     |                                                      |                      | -                          | 0.14      | -      | 0.036     | 0.0895    | 0.15      | -      | 0.18      | 0.42      | 0.437     | 0.016     | 0.062     |
| telurio              | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro                 | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño               | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio              | mg/L     |                                                      |                      | -                          | 0.004     | -      | 0.003     | 0.001     | < 0.001   | -      | 0.002     | < 0.001   | 0.0008    | 0.0056    | 0.0017    |
| uranio               | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio              | mg/L     |                                                      |                      | -                          | 0.002     | -      | 0.001     | 0.001     | < 0.001   | -      | 0.002     | 0.001     | 0.0014    | 0.002     | 0.0011    |
| zinc                 | mg/L     |                                                      |                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio             | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Total Metales</b> |          |                                                      |                      |                            |           |        |           |           |           |        |           |           |           |           |           |
| aluminio             | mg/L     | 0.2                                                  | P                    | -                          | 0.4       | -      | 0.29      | -         | 0.052     | -      | 0.3       | 0.088     | 0.11      | 2.41      | 0.095     |
| antimonio            | mg/L     | 0.005                                                | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico             | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | 0.002     | 0.0008    | 0.0002    | < 0.0002  |
| bario                | mg/L     | 0.7                                                  | P                    | -                          | 0.025     | -      | 0.021     | 0.021     | 0.026     | -      | 0.033     | 0.044     | 0.029     | 0.049     | 0.02      |
| berilio              | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto              | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                 | mg/L     | 5                                                    | CCME                 | -                          | 0.06      | -      | < 0.05    | < 0.05    | 0.06      | -      | 0.09      | 0.27      | 0.18      | < 0.01    | 0.02      |
| cadmio               | mg/L     | 0.003                                                | P                    | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W16 |           |        |           |           |           |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| calcio    | mg/L     |                                                      |                      | -                          | 10.1      | -      | 4.33      | 7.515     | 11.2      | -      | 11.9      | 28.3      | 25.6      | 2.41      | 5.82      |
| cromo     | mg/L     | 0.05                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0002    | 0.0014    | 0.0003    |
| cobalto   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | 0.001     | < 0.001   | < 0.0002  | 0.0026    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | P                    | -                          | 0.003     | -      | 0.002     | 0.001     | 0.001     | -      | 0.002     | 0.003     | 0.0012    | 0.0092    | 0.0011    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | 0.54      | -      | 0.52      | 0.35      | 0.19      | -      | 0.33      | 0.12      | 0.31      | 3.02      | 0.32      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0007    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | 0.002     | -      | < 0.001   | 0.001     | 0.002     | -      | 0.004     | 0.009     | 0.0063    | 0.0006    | 0.0005    |
| magnesio  | mg/L     |                                                      |                      | -                          | 19.5      | -      | 1.71      | 9.895     | 19.3      | -      | 24.4      | 67.1      | 64.7      | 1.4       | 4.95      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | 0.047     | -      | 0.031     | 0.0205    | 0.031     | -      | 0.13      | 0.008     | 0.035     | 0.154     | 0.018     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0008    | 0.0005    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0002    | 0.001     | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | 0.04      | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | 6.3       | -      | 0.9       | 3.1       | 6         | -      | 8.1       | 20.1      | 19.5      | 0.87      | 1.73      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | 0.003     | 0.0007    | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | 9         | -      | 7.8       | 8.35      | 10.8      | -      | 7         | 10.1      | 11.1      | 7.98      | 7.99      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | 149       | -      | 4.81      | 72        | 144       | -      | 191       | 505       | 513       | 3.68      | 29.3      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | 0.14      | -      | 0.036     | 0.087     | 0.15      | -      | 0.19      | 0.49      | 0.445     | 0.024     | 0.062     |
| telurio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | 0.008     | -      | 0.007     | 0.006     | 0.001     | -      | 0.001     | 0.002     | 0.0033    | 0.029     | 0.003     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | 0.0001    | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | 0.003     | -      | 0.002     | 0.002     | < 0.001   | -      | 0.001     | 0.001     | 0.0018    | 0.0095    | 0.0014    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | 0.005     | < 0.005   | 0.001     | 0.007     | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.10    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W19 |        |         |         |         |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|---------|---------|---------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | 24.2    | 24.2    | 23      | -      | -      | 25.8   | 25.9    | -      | 22.8    | 25      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | 7.1     | 7.54    | 7.7     | -      | -      | -      | 7.74    | -      | 7.61    | 7.5     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | 50      | -       | 60      | -      | -      | 58     | -       | -      | 50      | 203     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | 173     | -       | -       | -      | -      | 96     | -       | -      | 220     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | 1.69    | 9.01    | -       | -      | -      | 0.71   | -       | -      | 1.55    | 1.18    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | 7.12    | 6.61    | 6.93    | -      | -      | 7.33   | 7.72    | 7.41   | 7.29    | 7.4     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | 48      | 52      | 56      | -      | -      | 55     | 65      | 47     | 44      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | 14      | 17      | 15      | -      | -      | 16     | 14      | 12.8   | 12      | 13.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | 14      | 15      | 15      | -      | -      | 16     | 19      | 14.1   | 12.6    | 12.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | 34      | 49      | 36      | -      | -      | 51     | 37      | 48     | 34      | 53      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | 1       | 8       | < 1     | -      | -      | < 1    | < 1     | 3      | < 1     | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | 16.6    | 18.3    | 18.9    | -      | -      | 15.6   | 24.5    | 18.8   | 14      | 18.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | 20.2    | 22.4    | 23.1    | -      | -      | 19.1   | 29.9    | 23     | 17.1    | 22.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | < 0.5   | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | < 0.5   | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | 0.01    | < 0.01  | < 0.01  | -      | -      | < 0.01 | 0.02    | < 0.01 | < 0.01  | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | 0.09    | 0.09    | 0.09    | -      | -      | 0.07   | < 0.05  | 0.08   | 0.12    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | 0.09    | 0.09    | 0.09    | -      | -      | 0.07   | < 0.05  | -      | -       | 0.08    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | < 0.002 | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | <0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | < 0.2   | < 0.2   | < 0.2   | -      | -      | 0.2    | < 0.2   | 0.4    | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | 3.76    | 4.08    | 4.92    | -      | -      | 4.5    | 4.59    | 3.55   | 3.95    | 5.14    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | < 0.05  | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | <0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | 2.59    | 2.36    | 3.22    | -      | -      | 3.52   | 3.5     | 2.66   | 2.51    | 2.62    |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W19 |        |           |          |          |        |        |          |          |          |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------|-----------|----------|----------|--------|--------|----------|----------|----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08   | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | -      | < 0.2     | < 0.2    | < 0.2    | -      | -      | 0.2      | < 0.2    | 0.4      | 0.3       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | -      | < 20      | < 20     | < 20     | -      | -      | 20       | < 20     | <20      | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | -      | 1.4       | 2.6      | 1.2      | -      | -      | 3.1      | < 1      | 2.6      | 1.3       | < 1       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | -      | 3         | < 2      | 2        | -      | -      | 5        | < 2      | 7        | 4         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | -      | < 2       | < 2      | < 2      | -      | -      | < 2      | < 2      | < 2      | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | -      | < 0.001   | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -      | -         | -        | -        | -      | -      | -        | 5000     | -        | 11700     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -      | -         | -        | -        | -      | -      | -        | 3500     | -        | 1000      | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | -      | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | <0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | -      | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | <0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | -      | 0.032     | 0.055    | 0.019    | -      | -      | 0.016    | 0.016    | 0.11     | 0.048     | 0.026     |
| antimonio                            | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | -      | 0.011     | 0.013    | 0.012    | -      | -      | 0.013    | 0.012    | 0.011    | 0.011     | 0.013     |
| berilio                              | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | -      | < 0.01    | < 0.05   | < 0.05   | -      | -      | < 0.05   | < 0.05   | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | -      | < 0.00004 | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.0002 | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | -      | 3.28      | 4.25     | 3.48     | -      | -      | 3.77     | 3.35     | 3        | 2.78      | 3.23      |
| cromo                                | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | -                          | -      | 0.0002    | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.0015   | < 0.0002  | < 0.0002  |
| cobre                                | mg/L        |                                                      |                      | -                          | -      | 0.0005    | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.001    | 0.0005    | 0.0017    |
| hierro                               | mg/L        |                                                      |                      | -                          | -      | 0.02      | 0.12     | < 0.05   | -      | -      | < 0.05   | < 0.05   | 0.12     | 0.02      | 0.05      |
| plomo                                | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L        |                                                      |                      | -                          | -      | 1.42      | 1.45     | 1.48     | -      | -      | 1.51     | 1.36     | 1.3      | 1.24      | 1.31      |



**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W19 |        |           |           |           |        |        |           |           |          |           |           |
|----------------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|-----------|-----------|-----------|--------|--------|-----------|-----------|----------|-----------|-----------|
|                      |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| manganeso            | mg/L     |                                                      |                      | -                          | -      | 0.0028    | 0.009     | 0.003     | -      | -      | 0.003     | 0.001     | 0.0042   | 0.0023    | 0.0056    |
| mercurio             | mg/L     |                                                      |                      | -                          | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno            | µg/L     |                                                      |                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| níquel               | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0003   | < 0.0002  | < 0.0002  |
| fósforo              | mg/L     |                                                      |                      | -                          | -      | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio              | mg/L     |                                                      |                      | -                          | -      | 0.63      | 0.8       | 0.7       | -      | -      | 0.8       | 0.6       | 0.73     | 0.6       | 0.74      |
| selenio              | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| silicio              | mg/L     |                                                      |                      | -                          | -      | 6.22      | 6         | 6.3       | -      | -      | 6.5       | 5.4       | 6.74     | 6.91      | 5.99      |
| plata                | mg/L     |                                                      |                      | -                          | -      | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio                | mg/L     |                                                      |                      | -                          | -      | 3.54      | 3.52      | 3.7       | -      | -      | 3.9       | 3.74      | 3.44     | 3.25      | 3.58      |
| estroncio            | mg/L     |                                                      |                      | -                          | -      | 0.027     | 0.029     | 0.03      | -      | -      | 0.029     | 0.027     | 0.027    | 0.023     | 0.028     |
| telurio              | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio                | mg/L     |                                                      |                      | -                          | -      | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| toro                 | mg/L     |                                                      |                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño               | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio              | mg/L     |                                                      |                      | -                          | -      | 0.0009    | 0.002     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0052   | 0.0014    | 0.0004    |
| uranio               | mg/L     |                                                      |                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio              | mg/L     |                                                      |                      | -                          | -      | 0.0007    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0011   | 0.0005    | 0.0006    |
| zinc                 | mg/L     |                                                      |                      | -                          | -      | < 0.001   | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | <0.001   | < 0.001   | 0.002     |
| zirconio             | mg/L     |                                                      |                      | -                          | -      | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | <0.002   | < 0.002   | < 0.002   |
| <b>Total Metales</b> |          |                                                      |                      |                            |        |           |           |           |        |        |           |           |          |           |           |
| aluminio             | mg/L     | 0.2                                                  | P                    | -                          | -      | 0.065     | 0.17      | 0.024     | -      | -      | 0.24      | 0.022     | 0.24     | 0.077     | 0.043     |
| antimonio            | mg/L     | 0.005                                                | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico             | mg/L     | 0.01                                                 | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0004   | < 0.0002  | < 0.0002  |
| bario                | mg/L     | 0.7                                                  | P                    | -                          | -      | 0.012     | 0.015     | 0.012     | -      | -      | 0.012     | 0.017     | 0.013    | 0.011     | 0.014     |
| berilio              | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto              | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| boro                 | mg/L     | 5                                                    | CCME                 | -                          | -      | < 0.01    | < 0.05    | < 0.05    | -      | -      | < 0.05    | < 0.05    | <0.01    | < 0.01    | < 0.01    |
| cadmio               | mg/L     | 0.003                                                | P                    | -                          | -      | < 0.00004 | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | <0.00004 | < 0.00004 | < 0.00004 |
| calcio               | mg/L     |                                                      |                      | -                          | -      | 3.29      | 3.63      | 3.42      | -      | -      | 3.81      | 4.5       | 3.15     | 2.92      | 3.14      |
| cromo                | mg/L     | 0.05                                                 | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto              | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W19 |        |           |           |           |        |        |           |           |          |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|-----------|-----------|-----------|--------|--------|-----------|-----------|----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | P                    | -                          | -      | 0.0007    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0012   | 0.0004    | 0.0004    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | 0.08      | 0.35      | < 0.05    | -      | -      | < 0.05    | < 0.05    | 0.23     | 0.06      | 0.05      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | 1.41      | 1.42      | 1.48      | -      | -      | 1.54      | 1.84      | 1.5      | 1.3       | 1.24      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | 0.004     | 0.024     | 0.002     | -      | -      | 0.003     | 0.001     | 0.0041   | 0.0022    | 0.0027    |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | 0.64      | 0.8       | 0.7       | -      | -      | 0.8       | 0.7       | 0.7      | 0.64      | 0.72      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | 0.0012   | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | 6.14      | 5.9       | 6.4       | -      | -      | 6.6       | 7.3       | 7.11     | 7.17      | 5.81      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | 3.47      | 3.54      | 3.62      | -      | -      | 3.94      | 4.62      | 3.8      | 3.39      | 3.47      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | 0.026     | 0.028     | 0.03      | -      | -      | 0.03      | 0.036     | 0.027    | 0.023     | 0.028     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | 0.0014    | 0.003     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.005    | 0.0016    | 0.0007    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | 0.0008    | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0012   | 0.0006    | 0.0006    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | < 0.001   | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | 0.001    | 0.002     | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.17    | < 0.01    | <0.002   | < 0.002   | < 0.002   |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
(continuación)

| Parámetro                                                     | Unidades                                | Criterios asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |        |        |           |            |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|-----------|------------|--------|
|                                                               |                                         |                                                      |                      | Mínimo                     | Máximo | Media  | Promedio  | Desv. Est. | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |           |            |        |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 22.8                       | 29.4   | 25.95  | 26.0375   | 2.0786309  | 24     |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 6.61                       | 8.1    | 7.305  | 7.2       | -          | 20     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 30                         | 3920   | 70     | 376.75    | 872.48887  | 20     |
| redox                                                         | mV                                      |                                                      |                      | 70                         | 270    | 175    | 180.33333 | 60.925794  | 15     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | 0.71                       | 99     | 5.145  | 15.8725   | 25.759148  | 16     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |           |            |        |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 6.61                       | 7.75   | 7.38   | 7.1142575 | -          | 25     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 28                         | 3560   | 65     | 490.5     | 973.63287  | 25     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 7.5                        | 329    | 18     | 55.088    | 87.163674  | 25     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 9.2                        | 347    | 18     | 56.696    | 91.145984  | 25     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 19                         | 1,810  | 53     | 266.34    | 495.51788  | 25     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | <1                         | 268    | 4      | 23.28     | 54.871836  | 25     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 9.1                        | 42.5   | 21.4   | 23.126    | 8.5079022  | 25     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 11.1                       | 51.8   | 26.2   | 28.224    | 10.363609  | 25     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | <0.5                       | <0.5   | -      | -         | -          | 25     |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | <0.5                       | <0.5   | -      | -         | -          | 25     |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |           |            |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | <0.01                      | 0.09   | 0.01   | 0.0182    | 0.0202011  | 25     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | <0.01                      | 0.14   | 0.08   | 0.0698    | 0.0386889  | 25     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | <0.01                      | 0.14   | 0.07   | 0.0673684 | 0.0337214  | 19     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | <0.002                     | 0.004  | <0.002 | <0.002    | 0.0007234  | 25     |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | <0.2                       | 0.8    | <0.2   | 0.26      | 0.2160247  | 25     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |           |            |        |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.05                       | 972    | 4.57   | 125.3848  | 273.17067  | 25     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | <0.05                      | 0.25   | <0.05  | <0.05     | 0.0483477  | 25     |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 2.02                       | 136    | 3.36   | 18.7988   | 36.092208  | 25     |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |           |            |        |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | <0.2                       | 0.8    | <0.2   | 0.252     | 0.2023199  | 25     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | <10                        | 297    | 10     | 35.4      | 66.011363  | 25     |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | <1                         | 5.9    | 1.6    | 2.064     | 1.1722059  | 25     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | <2                         | 8      | 2      | 2.52      | 1.9815819  | 25     |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
(continuación)

| Parámetro                            | Unidades  | Criterios asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |         |            |            |        |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|----------|---------|------------|------------|--------|
|                                      |           |                                                      |                      | Mínimo                     | Máximo   | Media   | Promedio   | Desv. Est. | Conteo |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | <2                         | <2       | -       | -          | -          | 25     |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | <0.001                     | 0.011    | <0.001  | <0.001     | 0.0021894  | 23     |
| coliformes totales                   | CFU/100mL |                                                      |                      | 3,100                      | 28,000   | 11,100  | 11,644.444 | 7,675.466  | 9      |
| coliformes fecales                   | CFU/100mL |                                                      |                      | 1,000                      | 5,300    | 2,800   | 2,883.3333 | 1,152.1719 | 9      |
| <b>Especies de Cianuro</b>           |           |                                                      |                      |                            |          |         |            |            |        |
| cianuro total                        | mg/L      | 0.001                                                | P                    | <0.002                     | <0.01    | -       | -          | -          | 25     |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | <0.002                     | <0.01    | -       | -          | -          | 25     |
| <b>Metales Disueltos</b>             |           |                                                      |                      |                            |          |         |            |            |        |
| aluminio                             | mg/L      |                                                      |                      | <0.005                     | 0.26     | 0.039   | 0.0702     | 0.0694273  | 25     |
| antimonio                            | mg/L      |                                                      |                      | <0.0002                    | 0.0005   | 0.0005  | 0.000352   | 0.0001896  | 25     |
| arsénico                             | mg/L      |                                                      |                      | <0.0002                    | 0.003    | 0.0005  | 0.000464   | 0.0005663  | 25     |
| bario                                | mg/L      |                                                      |                      | 0.0098                     | 0.035    | 0.017   | 0.017832   | 0.006807   | 25     |
| berilio                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -       | -          | -          | 25     |
| bismuto                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -       | -          | -          | 25     |
| boro                                 | mg/L      |                                                      |                      | <0.01                      | 0.22     | 0.025   | 0.0384     | 0.0512697  | 25     |
| cadmio                               | mg/L      |                                                      |                      | <0.00004                   | 0.00017  | 0.0001  | 0.000074   | 4.359E-05  | 25     |
| calcio                               | mg/L      |                                                      |                      | 1.84                       | 25.2     | 4.45    | 6.7334     | 6.0986783  | 25     |
| cromo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0007   | 0.0005  | 0.000376   | 0.0001943  | 25     |
| cobalto                              | mg/L      |                                                      |                      | <0.0002                    | 0.0061   | 0.0005  | 0.001568   | 0.0016688  | 25     |
| cobre                                | mg/L      |                                                      |                      | <0.0005                    | 0.002    | 0.0005  | 0.000898   | 0.0005613  | 25     |
| hierro                               | mg/L      |                                                      |                      | <0.02                      | 0.65     | 0.12    | 0.1318     | 0.1262676  | 25     |
| plomo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0006   | 0.0005  | 0.00036    | 0.0002     | 25     |
| litio                                | mg/L      |                                                      |                      | <0.0002                    | 0.008    | 0.0005  | 0.00116    | 0.0019987  | 25     |
| magnesio                             | mg/L      |                                                      |                      | 0.71                       | 64.5     | 1.68    | 9.2776     | 17.491091  | 25     |
| manganeso                            | mg/L      |                                                      |                      | 0.001                      | 0.099    | 0.01    | 0.024482   | 0.0262581  | 25     |
| mercurio                             | mg/L      |                                                      |                      | <0.00002                   | <0.00002 | -       | -          | -          | 25     |
| molibdeno                            | µg/L      |                                                      |                      | <0.0001                    | 0.0006   | 0.00025 | 0.000206   | 0.0001523  | 25     |
| níquel                               | mg/L      |                                                      |                      | <0.0002                    | 0.002    | 0.0005  | 0.000508   | 0.0003605  | 25     |
| fósforo                              | mg/L      |                                                      |                      | <0.03                      | <0.15    | -       | -          | -          | 25     |
| potasio                              | mg/L      |                                                      |                      | 0.56                       | 19.2     | 0.8     | 3.0776     | 5.2312596  | 25     |
| selenio                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -       | -          | -          | 25     |
| silicio                              | mg/L      |                                                      |                      | 4.64                       | 11.3     | 7       | 7.384      | 1.6561174  | 25     |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro            | Unidades | Criterios asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |         |           |            |        |
|----------------------|----------|------------------------------------------------------|----------------------|----------------------------|----------|---------|-----------|------------|--------|
|                      |          |                                                      |                      | Mínimo                     | Máximo   | Media   | Promedio  | Desv. Est. | Conteo |
| plata                | mg/L     |                                                      |                      | <0.00005                   | <0.00025 | -       | -         | -          | 25     |
| sodio                | mg/L     |                                                      |                      | 2.02                       | 519      | 3.83    | 67.6708   | 145.13216  | 25     |
| estroncio            | mg/L     |                                                      |                      | 0.014                      | 0.437    | 0.035   | 0.0815    | 0.1130446  | 25     |
| telurio              | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 25     |
| talio                | mg/L     |                                                      |                      | <0.00002                   | <0.0001  | -       | -         | -          | 25     |
| toro                 | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -       | -         | -          | 25     |
| estaño               | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 25     |
| titanio              | mg/L     |                                                      |                      | <0.0004                    | 0.0071   | 0.00105 | 0.00211   | 0.0019909  | 25     |
| uranio               | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -       | -         | -          | 25     |
| vanadio              | mg/L     |                                                      |                      | <0.0005                    | 0.002    | 0.0009  | 0.000932  | 0.0004854  | 25     |
| zinc                 | mg/L     |                                                      |                      | <0.001                     | 0.005    | 0.0025  | 0.00206   | 0.0010137  | 25     |
| zirconio             | mg/L     |                                                      |                      | <0.002                     | <0.01    | -       | -         | -          | 25     |
| <b>Total Metales</b> |          |                                                      |                      |                            |          |         |           |            |        |
| aluminio             | mg/L     | 0.2                                                  | P                    | 0.022                      | 2.41     | 0.14    | 0.3798542 | 0.58485    | 24     |
| antimonio            | mg/L     | 0.005                                                | P                    | <0.0002                    | <0.001   | -       | -         | -          | 25     |
| arsénico             | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.002    | 0.0005  | 0.000444  | 0.0003809  | 25     |
| bario                | mg/L     | 0.7                                                  | P                    | 0.011                      | 0.049    | 0.021   | 0.02186   | 0.0093914  | 25     |
| berilio              | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | <0.001   | -       | -         | -          | 25     |
| bismuto              | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 25     |
| boro                 | mg/L     | 5                                                    | CCME                 | <0.01                      | 0.27     | 0.025   | 0.0408    | 0.0606678  | 25     |
| cadmio               | mg/L     | 0.003                                                | P                    | <0.00004                   | 0.00011  | 0.0001  | 0.0000716 | 3.955E-05  | 25     |
| calcio               | mg/L     |                                                      |                      | 2.13                       | 28.3     | 4.37    | 6.9142    | 6.5778897  | 25     |
| cromo                | mg/L     | 0.05                                                 | P                    | <0.0002                    | 0.0014   | 0.0005  | 0.000424  | 0.000265   | 25     |
| cobalto              | mg/L     |                                                      |                      | <0.0002                    | 0.0026   | 0.0005  | 0.000532  | 0.0005218  | 25     |
| cobre                | mg/L     | 1                                                    | P                    | <0.0004                    | 0.0092   | 0.001   | 0.001776  | 0.0019411  | 25     |
| hierro               | mg/L     | 0.3                                                  | P                    | <0.05                      | 3.02     | 0.31    | 0.4374    | 0.6164247  | 25     |
| plomo                | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.0007   | 0.0005  | 0.000372  | 0.000199   | 25     |
| litio                | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | 0.009    | 0.0005  | 0.001256  | 0.0021364  | 25     |
| magnesio             | mg/L     |                                                      |                      | 0.93                       | 67.1     | 1.72    | 9.5532    | 18.173147  | 25     |
| manganeso            | mg/L     | 0.1                                                  | P                    | 0.001                      | 0.154    | 0.0205  | 0.031692  | 0.0397315  | 25     |
| mercurio             | mg/L     | 0.001                                                | P                    | <0.00002                   | <0.00002 | -       | -         | -          | 25     |
| molibdeno            | mg/L     | 0.07                                                 | P                    | <0.0001                    | 0.0008   | 0.00025 | 0.00021   | 0.0001689  | 25     |
| níquel               | mg/L     | 0.02                                                 | P                    | <0.0002                    | 0.001    | 0.0005  | 0.000392  | 0.0002216  | 25     |

**Tabla 10**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |         |          |            |        |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|----------|---------|----------|------------|--------|
|           |          |                                                      |                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Est. | Conteo |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | <0.03                      | 0.075    | 0.075   | 0.052    | 0.0291548  | 25     |
| potasio   | mg/L     |                                                      |                      | 0.64                       | 20.1     | 0.87    | 3.1462   | 5.4063572  | 25     |
| selenio   | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.003    | 0.0005  | 0.000648 | 0.0007148  | 25     |
| silicio   | mg/L     |                                                      |                      | 5.54                       | 11.1     | 7.3     | 7.665    | 1.5259259  | 25     |
| plata     | mg/L     | 0.05                                                 | P                    | <0.00005                   | <0.00025 | -       | -        | -          | 25     |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 2.04                       | 513      | 3.94    | 66.831   | 143.21534  | 25     |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.018                      | 0.49     | 0.036   | 0.08596  | 0.1230591  | 25     |
| telurio   | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -        | -          | 25     |
| talio     | mg/L     |                                                      |                      | <0.00001                   | <0.0001  | -       | -        | -          | 25     |
| toro      | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -       | -        | -          | 25     |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | <0.0002                    | <0.001   | -       | -        | -          | 25     |
| titanio   | mg/L     |                                                      |                      | <0.0007                    | 0.029    | 0.003   | 0.004886 | 0.0063259  | 25     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | <0.0001                    | 0.00025  | 0.00025 | 0.000172 | 9.798E-05  | 25     |
| vanadio   | mg/L     |                                                      |                      | <0.0006                    | 0.0095   | 0.001   | 0.00173  | 0.0018686  | 25     |
| zinc      | mg/L     | 5                                                    | P                    | <0.001                     | 0.015    | 0.0025  | 0.00278  | 0.002905   | 25     |
| zirconio  | mg/L     |                                                      |                      | <0.002                     | <0.17    | -       | -        | -          | 25     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla – Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

<sup>(c)</sup> P: Reglamento panameño 351 Concentraciones máximas permisibles en el agua potable (1999);

AO: Objetivo estético

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la Salud Humana.

CCME: Consejo Canadiense de Ministros del Medio Ambiente, Lineamientos Canadienses para la Salud Humana para la Calidad del Agua Potable en Canadá (2008);

ORNL: Niveles de análisis del agua del grifo del Oak Ridge National Laboratory para contaminantes químicos en sitios del Superfondo (lineamientos ajustados para reflejar un ILCR de 10-5, HQ de 0.2) (Septiembre 2008).

Tabla 11 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W1 |         |         |         |         |        |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|---------|---------|--------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 24.8                      | 27      | 24      | 24.6    | -       | -      | 25      | 25.7   | 26.2    | 25.7    | 24.3    | 24.1    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                       | 5.7     | 6.78    | 7.05    | -       | -      | 6.62    | -      | 6.91    | 7.3     | 6.74    | 6.75    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 40                        | 40      | 60      | -       | -       | -      | 30      | 43     | -       | 50      | 40      | 157     |
| redox                                                         | mV                                      |                                                      |                      | 225                       | 190     | 150     | -       | -       | -      | -       | 91     | -       | 327     | 231     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 10.87   | 4.87    | -       | -      | 24.4    | 0.36   | -       | 1.73    | 52.5    | 3.94    |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 6.94                      | 7.07    | 6.97    | 6.33    | 7.06    | -      | 6.57    | 7.06   | 7.15    | 7.16    | 6.44    | 7.04    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 42                        | 44      | 34      | 42      | 50      | -      | 29      | 44     | 44      | 46      | 19      | 40      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 11.5                      | 13      | 8.7     | 10      | 10      | -      | 7.3     | 11     | 11.8    | 11.7    | 4.2     | 9.9     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 11.7                      | 12      | 8.5     | 10      | 10      | -      | 6.9     | 11     | 12      | 12.3    | 5.4     | 9.5     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 43                        | 39      | 17      | 40      | 48      | -      | 46      | 31     | 43      | 33      | 10      | 53      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | < 1                       | < 1     | 11      | 2       | 1       | -      | 189     | < 1    | < 1     | 1       | 248     | 5       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 11.4                      | 10.7    | 9.4     | 10.5    | 12.9    | -      | 6.32    | 9.5    | 11.9    | 13.3    | 5       | 11.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 14                        | 13      | 11.5    | 12.8    | 15.8    | -      | 7.71    | 11.6   | 14.5    | 16.2    | 6.1     | 14.1    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | 0.01    | < 0.01 | < 0.01  | < 0.01  | 0.01    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.08                      | 0.13    | 0.23    | 0.14    | 0.14    | -      | 0.15    | 0.11   | 0.1     | 0.1     | 0.11    | 0.13    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.08                      | 0.13    | 0.23    | 0.14    | 0.14    | -      | 0.15    | 0.11   | 0.1     | -       | -       | 0.13    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | -      | < 0.002 | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                     | < 0.2   | < 0.2   | < 0.2   | < 0.2   | -      | 0.3     | 0.4    | < 0.2   | 0.2     | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 0.7                       | 3.09    | 2.77    | 3.32    | 3.41    | -      | 2.96    | 3.25   | 3.4     | 3.36    | 1.7     | 4.22    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | -      | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 0.89                      | 4.18    | 3.73    | 4.51    | 4.36    | -      | 3.09    | 5.66   | 5.18    | 5.48    | 2.02    | 3.5     |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W1 |              |           |           |           |        |              |           |           |          |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|---------------------------|--------------|-----------|-----------|-----------|--------|--------------|-----------|-----------|----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                   | Oct-07       | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08       | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                           |              |           |           |           |        |              |           |           |          |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | < 0.2                     | < 0.2        | < 0.2     | < 0.2     | < 0.2     | -      | 0.3          | 0.4       | < 0.2     | 0.2      | 0.3       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | < 20                      | < 20         | 23        | < 20      | 22        | -      | 20           | 26        | < 20      | 26       | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | < 1                       | 1.2          | -         | < 1       | 1.4       | -      | 2.6          | 1.5       | < 1       | 1.4      | 2         | 1.2       |
| aceite y grasa total                 | mg/L        |                                                      |                      | < 2                       | < 2          | < 2       | < 2       | 2         | -      | 2            | 3         | < 2       | 6        | -         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | < 2                       | < 2          | < 2       | < 2       | < 2       | -      | < 2          | < 2       | < 2       | < 2      | -         | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | < 0.001                   | <b>0.004</b> | < 0.001   | < 0.001   | < 0.001   | -      | <b>0.005</b> | < 0.001   | < 0.001   | < 0.001  | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                         | -            | -         | -         | -         | -      | -            | 1,300     | 800       | 5,550    | 5,200     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                         | -            | -         | -         | -         | -      | -            | 1,000     | 100       | 300      | 1,500     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                           |              |           |           |           |        |              |           |           |          |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | < 0.01                    | < 0.01       | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01       | < 0.01    | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | < 0.01                    | < 0.01       | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01       | < 0.01    | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                           |              |           |           |           |        |              |           |           |          |           |           |
| aluminio                             | mg/L        |                                                      |                      | 0.008                     | 0.013        | 0.063     | 0.013     | 0.014     | -      | 0.15         | 0.008     | 0.004     | 0.008    | 0.23      | 0.023     |
| antimonio                            | mg/L        |                                                      |                      | 0.0003                    | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | < 0.0002                  | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | 0.0003    | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | 0.011                     | 0.01         | 0.0074    | 0.009     | 0.009     | -      | 0.0057       | 0.009     | 0.01      | 0.01     | 0.0039    | 0.011     |
| berilio                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | < 0.01                    | < 0.05       | < 0.01    | < 0.05    | 0.08      | -      | 0.01         | < 0.05    | < 0.01    | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | < 0.00004                 | < 0.0002     | < 0.00004 | < 0.0002  | < 0.0002  | -      | < 0.00004    | < 0.0002  | < 0.00004 | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | 2.68                      | 2.74         | 1.78      | 2.3       | 2.18      | -      | 1.52         | 2.36      | 2.5       | 2.62     | 0.83      | 2.13      |
| cromo                                | mg/L        |                                                      |                      | < 0.0002                  | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | < 0.0002  | <0.0002  | 0.0002    | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | 0.0068                    | < 0.001      | 0.0009    | 0.004     | < 0.001   | -      | 0.0011       | < 0.001   | 0.0004    | <0.0002  | 0.0036    | 0.0024    |
| cobre                                | mg/L        |                                                      |                      | 0.0056                    | 0.006        | 0.0075    | 0.006     | 0.007     | -      | 0.02         | 0.005     | 0.0064    | 0.0024   | 0.014     | 0.012     |
| hierro                               | mg/L        |                                                      |                      | 0.05                      | 0.07         | 0.08      | 0.07      | 0.06      | -      | 0.18         | < 0.05    | 0.06      | 0.03     | 0.23      | 0.09      |
| plomo                                | mg/L        |                                                      |                      | < 0.0002                  | < 0.001      | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002     | < 0.001   | < 0.0002  | <0.0002  | 0.0008    | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | 0.0002                    | < 0.001      | 0.0002    | < 0.001   | < 0.001   | -      | < 0.0002     | 0.001     | 0.0002    | 0.0002   | < 0.0002  | 0.0003    |
| magnesio                             | mg/L        |                                                      |                      | 1.17                      | 1.53         | 1.04      | 1.15      | 1.22      | -      | 0.84         | 1.26      | 1.35      | 1.26     | 0.51      | 1.12      |
| manganeso                            | mg/L        |                                                      |                      | 0.049                     | 0.036        | 0.032     | 0.034     | 0.036     | -      | 0.032        | 0.028     | 0.034     | <0.0002  | 0.031     | 0.043     |
| mercurio                             | mg/L        |                                                      |                      | < 0.00002                 | < 0.00002    | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002    | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |



Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W1 |           |           |           |           |        |           |           |           |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| molibdeno     | µg/L     |                                                      |                      | 0.0005                    | 0.0005    | 0.0003    | < 0.0005  | 0.0005    | -      | 0.0004    | < 0.0005  | 0.0004    | 0.0004   | 0.0003    | 0.0003    |
| níquel        | mg/L     |                                                      |                      | 0.0009                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | 0.0002    | < 0.001   | < 0.0002  | <0.0002  | 0.0006    | 0.0004    |
| fósforo       | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.03    | <0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.66                      | 0.6       | 0.55      | 0.6       | 0.5       | -      | 0.64      | 0.6       | 0.58      | 0.58     | 0.41      | 0.55      |
| selenio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 6.31                      | 7.2       | 5.1       | 5.6       | 5.6       | -      | 3.54      | 5.8       | 6.27      | 6.71     | 3.1       | 4.64      |
| plata         | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | < 0.00005 | < 0.00025 | < 0.00005 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | 2.89                      | 3.37      | 2.46      | 2.82      | 2.96      | -      | 2.49      | 3.05      | 3.18      | 3.07     | 1.44      | 2.77      |
| estroncio     | mg/L     |                                                      |                      | 0.022                     | 0.022     | 0.015     | 0.018     | 0.019     | -      | 0.014     | 0.019     | 0.021     | 0.02     | 0.0072    | 0.018     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.0001  | < 0.00002 | <0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0001  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0004                    | < 0.001   | 0.0012    | < 0.001   | < 0.001   | -      | 0.0031    | < 0.001   | 0.0003    | 0.0003   | 0.0049    | 0.0005    |
| uranio        | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0001  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0003                    | < 0.001   | 0.0004    | < 0.001   | < 0.001   | -      | 0.0006    | < 0.001   | < 0.0002  | <0.0002  | 0.0007    | 0.0002    |
| zinc          | mg/L     |                                                      |                      | 0.007                     | < 0.005   | 0.005     | 0.005     | 0.006     | -      | 0.007     | < 0.005   | 0.006     | 0.002    | 0.004     | 0.007     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.01    | < 0.002   | <0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                           |           |           |           |           |        |           |           |           |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.028                     | 0.021     | 0.15      | 0.024     | 0.041     | -      | 0.69      | 0.22      | 0.012     | 0.11     | 1.63      | 0.064     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.01                      | 0.01      | 0.0086    | 0.01      | 0.009     | -      | 0.016     | 0.01      | 0.011     | 0.013    | 0.02      | 0.011     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | 0.08      | -      | 0.01      | < 0.05    | < 0.05    | 0.02     | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | -      | < 0.00004 | < 0.0002  | < 0.0002  | <0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 2.37                      | 2.56      | 1.7       | 2.11      | 2.12      | -      | 1.4       | 2.43      | 2.47      | 2.63     | 0.99      | 2.01      |
| cromo         | mg/L     | 0.05                                                 | P                    | 0.0002                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | 0.0008    | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | 0.0015    | < 0.001   | < 0.001   | 0.0004   | 0.0028    | 0.0002    |
| cobre         | mg/L     | 1                                                    | P                    | 0.0091                    | 0.008     | 0.011     | 0.007     | 0.008     | -      | 0.075     | 0.007     | 0.007     | 0.015    | 0.101     | 0.014     |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.11                      | 0.14      | 0.18      | 0.1       | 0.1       | -      | 1.36      | 0.1       | 0.08      | 0.35     | 1.85      | 0.16      |
| plomo         | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | 0.0011    | < 0.001   | < 0.001   | <0.0002  | 0.002     | < 0.0002  |

Tabla 11 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W1 |           |           |           |           |        |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0003                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | 0.0003    | 0.001     | < 0.001   | 0.0005    | 0.0005    | 0.0003    |
| magnesio  | mg/L     |                                                      |                      | 1.4                       | 1.42      | 1.04      | 1.13      | 1.21      | -      | 0.83      | 1.29      | 1.34      | 1.39      | 0.72      | 1.09      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.028                     | 0.028     | 0.037     | 0.027     | 0.035     | -      | 0.124     | 0.029     | 0.034     | 0.05      | 0.192     | 0.039     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | 0.0005                    | < 0.0005  | 0.0003    | < 0.0005  | < 0.0005  | -      | 0.0006    | < 0.0005  | < 0.0005  | 0.0005    | 0.0005    | 0.0002    |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | 0.0002    | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.58                      | 0.6       | 0.55      | 0.6       | 0.5       | -      | 0.66      | 0.6       | 0.6       | 0.59      | 0.56      | 0.5       |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | 0.0005    | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 6.42                      | 6.7       | 4.88      | 5.2       | 5.4       | -      | 3.41      | 6         | 6.1       | 7.8       | 3.94      | 4.41      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | 0.00006   | < 0.00025 | < 0.00025 | 0.00006   | 0.0013    | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 3.18                      | 3.11      | 2.46      | 3.13      | 2.74      | -      | 2.33      | 3.03      | 3.45      | 3.54      | 1.47      | 2.62      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.02                      | 0.021     | 0.015     | 0.017     | 0.018     | -      | 0.014     | 0.02      | 0.021     | 0.026     | 0.0098    | 0.018     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0007                    | < 0.001   | 0.0057    | < 0.001   | < 0.001   | -      | 0.004     | < 0.001   | < 0.001   | 0.0025    | 0.0096    | 0.0006    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0004                    | < 0.001   | 0.0005    | < 0.001   | < 0.001   | -      | 0.0023    | < 0.001   | < 0.001   | 0.0006    | 0.0054    | 0.0003    |
| zinc      | mg/L     | 5                                                    | P                    | 0.004                     | < 0.005   | 0.004     | < 0.005   | < 0.005   | -      | 0.009     | 0.008     | < 0.005   | 0.005     | 0.013     | 0.005     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

| Parámetro           | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W2 |        |        |        |        |        |        |        |         |        |        |        |
|---------------------|-------------|------------------------------------------------------|----------------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|                     |             |                                                      |                      | Sept-07                   | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09 |
| Parámetros de Campo |             |                                                      |                      |                           |        |        |        |        |        |        |        |         |        |        |        |
| temperatura         | °C          | ≤15                                                  | CCME-AO              | 25.6                      | 26.2   | -      | -      | -      | -      | -      | 25.7   | 28.7    | 27.6   | 23.7   | 24.6   |
| pH                  | unidades pH | 6.5 - 8.5                                            | P                    | n/a                       | 5.7    | -      | -      | -      | -      | -      | -      | 7.28    | 7.6    | 6.94   | 6.78   |
| conductividad       | µS/cm       |                                                      |                      | 40                        | 60     | -      | -      | -      | -      | -      | 43     | -       | 50     | 20     | 172    |
| redox               | mV          |                                                      |                      | 240                       | 190    | -      | -      | -      | -      | -      | 74     | -       | 304    | 235    | 40     |
| turbidez            | NTU         | 1                                                    | P                    | -                         | -      | -      | -      | -      | -      | -      | 2.69   | -       | 7.61   | 19.4   | 8.84   |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W2 |         |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 7.06                      | 7.21    | -      | -      | -      | -      | -      | 7.12   | 7.26    | 7.3     | 7.06    | 7.07    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 42                        | 45      | -      | -      | -      | -      | -      | 44     | 42      | 47      | 29      | 38.5    |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 13.3                      | 14      | -      | -      | -      | -      | -      | 11     | 13      | 13.9    | 4.9     | 9.2     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 12.4                      | 13      | -      | -      | -      | -      | -      | 12     | 12      | 13.4    | 5.3     | 9.5     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 51                        | 47      | -      | -      | -      | -      | -      | 35     | 37      | 45      | < 10    | 19      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 10                        | 4       | -      | -      | -      | -      | -      | 4      | < 1     | 8       | 30      | 10.5    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 13.8                      | 13.7    | -      | -      | -      | -      | -      | 11.4   | 13.5    | 16.8    | 10.9    | 11.65   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 16.8                      | 16.7    | -      | -      | -      | -      | -      | 13.9   | 16.5    | 20.4    | 13.3    | 14.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | -      | -      | -      | -      | -      | < 0.01 | 0.02    | < 0.01  | < 0.01  | 0.03    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.1                       | 0.08    | -      | -      | -      | -      | -      | 0.07   | 0.1     | 0.08    | 0.12    | 0.085   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.1                       | 0.08    | -      | -      | -      | -      | -      | 0.07   | 0.1     | -       | -       | 0.085   |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | -      | -      | -      | -      | -      | <0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                     | < 0.2   | -      | -      | -      | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.98                      | 3.09    | -      | -      | -      | -      | -      | 3.22   | 3.15    | 3.33    | 1.84    | 4.59    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 3.63                      | 2.92    | -      | -      | -      | -      | -      | 4.14   | 3.6     | 4.09    | 1.89    | 2.63    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | < 0.2                     | < 0.2   | -      | -      | -      | • -    | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | 21                        | < 20    | -      | -      | -      | -      | -      | 26     | < 20    | 38      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | 1.3                       | 1.5     | -      | -      | -      | -      | -      | 2.1    | 1.4     | 1.6     | 2.2     | 1.5     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | < 2                       | < 2     | -      | -      | -      | -      | -      | 4      | < 2     | 6       | < 2     | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                       | < 2     | -      | -      | -      | -      | -      | < 2    | < 2     | < 2     | < 2     | < 2     |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W2 |           |        |        |        |        |        |           |           |          |           |           |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|----------|-----------|-----------|
|                                      |           |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | < 0.001                   | 0.013     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.001  | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL |                                                      |                      | -                         | -         | -      | -      | -      | -      | -      | 2000      | 3400      | 900      | 5800      | -         |
| coliformes fecales                   | CFU/100mL |                                                      |                      | -                         | -         | -      | -      | -      | -      | -      | 900       | 1600      | 100      | 2000      | -         |
| Especies de Cianuro                  |           |                                                      |                      |                           |           |        |        |        |        |        |           |           |          |           |           |
| cianuro total                        | mg/L      | 0.001                                                | P                    | < 0.01                    | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | < 0.01                    | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| Metales Disueltos                    |           |                                                      |                      |                           |           |        |        |        |        |        |           |           |          |           |           |
| aluminio                             | mg/L      |                                                      |                      | 0.012                     | 0.015     | -      | -      | -      | -      | -      | 0.005     | 0.018     | 0.005    | 0.12      | 0.025     |
| antimonio                            | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | 0.0002    | < 0.0002  |
| arsénico                             | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L      |                                                      |                      | 0.01                      | 0.009     | -      | -      | -      | -      | -      | 0.008     | 0.009     | 0.0084   | 0.0052    | 0.01      |
| berilio                              | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L      |                                                      |                      | < 0.01                    | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L      |                                                      |                      | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | <0.00004 | 0.00018   | < 0.00004 |
| calcio                               | mg/L      |                                                      |                      | 3                         | 3.08      | -      | -      | -      | -      | -      | 2.5       | 2.81      | 3.15     | 1.01      | 2.02      |
| cromo                                | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | 0.0064    | 0.00135   |
| cobre                                | mg/L      |                                                      |                      | 0.0022                    | 0.003     | -      | -      | -      | -      | -      | 0.002     | 0.003     | 0.0031   | 0.0078    | 0.0071    |
| hierro                               | mg/L      |                                                      |                      | 0.06                      | 0.1       | -      | -      | -      | -      | -      | < 0.05    | 0.1       | 0.07     | 0.13      | 0.075     |
| plomo                                | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L      |                                                      |                      | 0.0002                    | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001   | <0.0002  | < 0.0002  | 0.0003    |
| magnesio                             | mg/L      |                                                      |                      | 1.42                      | 1.5       | -      | -      | -      | -      | -      | 1.26      | 1.41      | 1.46     | 0.57      | 1.015     |
| manganeso                            | mg/L      |                                                      |                      | 0.019                     | 0.02      | -      | -      | -      | -      | -      | 0.018     | 0.029     | <0.0002  | 0.03      | 0.0265    |
| mercurio                             | mg/L      |                                                      |                      | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | µg/L      |                                                      |                      | 0.0003                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003   | < 0.0001  | < 0.0001  |
| níquel                               | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | 0.001     | 0.00025   |
| fósforo                              | mg/L      |                                                      |                      | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L      |                                                      |                      | 0.48                      | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5       | 0.47     | 0.33      | 0.43      |
| selenio                              | mg/L      |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L      |                                                      |                      | 6.6                       | 7         | -      | -      | -      | -      | -      | 5.6       | 6.1       | 6.94     | 3.19      | 3.86      |
| plata                                | mg/L      |                                                      |                      | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L      |                                                      |                      | 3.06                      | 3.28      | -      | -      | -      | -      | -      | 2.86      | 3.15      | 3.27     | 1.55      | 2.66      |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W2 |           |        |        |        |        |        |           |          |          |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|----------|----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08  | Oct-08   | Nov-08    | Feb-09    |
| estroncio     | mg/L     |                                                      |                      | 0.022                     | 0.023     | -      | -      | -      | -      | -      | 0.019     | 0.022    | 0.023    | 0.0083    | 0.017     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001 | <0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005 | <0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0005                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | 0.001    | 0.0003   | 0.0026    | 0.0009    |
| uranio        | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005 | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0006                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0007   | 0.0005    | 0.0003    |
| zinc          | mg/L     |                                                      |                      | 0.003                     | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005  | <0.001   | 0.005     | 0.005     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01   | <0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                           |           |        |        |        |        |        |           |          |          |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.14                      | 0.067     | -      | -      | -      | -      | -      | 0.58      | 0.039    | 0.17     | 0.27      | 0.087     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0003   | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.01                      | 0.01      | -      | -      | -      | -      | -      | 0.01      | 0.012    | 0.011    | 0.007     | 0.0115    |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | < 0.01                    | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05   | 0.01     | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002 | <0.00004 | 0.00017   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 2.47                      | 2.82      | -      | -      | -      | -      | -      | 2.6       | 2.64     | 2.96     | 1.08      | 2.055     |
| cromo         | mg/L     | 0.05                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | 0.0002                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0002   | < 0.0002  | 0.0002    |
| cobre         | mg/L     | 1                                                    | P                    | 0.0077                    | 0.01      | -      | -      | -      | -      | -      | 0.005     | 0.005    | 0.014    | 0.01      | 0.0098    |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.26                      | 0.3       | -      | -      | -      | -      | -      | 0.21      | 0.16     | 0.56     | 0.24      | 0.215     |
| plomo         | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0002   | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | 0.0003                    | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001  | 0.0005   | 0.0002    | 0.00025   |
| magnesio      | mg/L     |                                                      |                      | 1.52                      | 1.42      | -      | -      | -      | -      | -      | 1.3       | 1.36     | 1.46     | 0.63      | 1.065     |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.023                     | 0.022     | -      | -      | -      | -      | -      | 0.022     | 0.014    | 0.023    | 0.024     | 0.0335    |
| mercurio      | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002 | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | 0.0003                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005 | 0.0003   | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15   | <0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.45                      | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5      | 0.46     | 0.37      | 0.43      |
| selenio       | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | 0.002    | 0.0006   | < 0.0002  | < 0.0002  |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W2 |           |        |        |        |        |        |           |           |          |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| silicio   | mg/L     |                                                      |                      | 6.43                      | 6.5       | -      | -      | -      | -      | -      | 5.5       | 5.6       | 7.72     | 3.54      | 3.93      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 3.25                      | 3.01      | -      | -      | -      | -      | -      | 2.94      | 3.2       | 3.43     | 1.59      | 2.725     |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.02                      | 0.022     | -      | -      | -      | -      | -      | 0.02      | 0.021     | 0.027    | 0.0094    | 0.018     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0022                    | < 0.001   | -      | -      | -      | -      | -      | 0.002     | < 0.001   | 0.0037   | 0.0025    | 0.001     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0012                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.002    | 0.0009    | 0.0006    |
| zinc      | mg/L     | 5                                                    | P                    | 0.003                     | < 0.005   | -      | -      | -      | -      | -      | 0.006     | 0.005     | 0.003    | 0.003     | 0.004     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.12    | < 0.01    | <0.002   | < 0.002   | < 0.002   |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W10 |         |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | 26.2    | -      | -      | -      | -      | -      | 25.5   | 30.6    | 27.1    | 22.7    | 24      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                        | 6.1     | -      | -      | -      | -      | -      | -      | 7.45    | 7.6     | 7.04    | 7.13    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | 40      | -      | -      | -      | -      | -      | 41     | -       | 70      | 20      | 197     |
| redox                                                         | mV                                      |                                                      |                      | -                          | 180     | -      | -      | -      | -      | -      | 114    | -       | 315     | 236     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -      | -      | -      | -      | -      | 6.55   | -       | 2       | 13.9    | 2.2     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | 7.18    | -      | -      | -      | -      | -      | 7.14   | 7.41    | 7.39    | 6.6     | 7.29    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | 39      | -      | -      | -      | -      | -      | 40     | 44      | 48      | 20      | 41      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 12      | -      | -      | -      | -      | -      | 11     | 13      | 13.1    | 4.9     | 10.9    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 13      | -      | -      | -      | -      | -      | 12     | 13      | 15.4    | 5.2     | 10.5    |
| total de sólidos disueltos                                    | μS/cm                                   | 500                                                  | P                    | -                          | 16      | -      | -      | -      | -      | -      | 29     | 41      | 35      | < 10    | 52      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | 1       | -      | -      | -      | -      | -      | 3      | 1       | 1       | 22      | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | 12.9    | -      | -      | -      | -      | -      | 12     | 15.7    | 20.3    | 6.3     | 15.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | 15.7    | -      | -      | -      | -      | -      | 15.6   | 19.1    | 24.7    | 7.7     | 19.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | < 0.01  | -      | -      | -      | -      | -      | 0.01   | 0.02    | < 0.01  | 0.02    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | 0.13    | -      | -      | -      | -      | -      | 0.07   | 0.05    | 0.06    | 0.1     | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | 0.13    | -      | -      | -      | -      | -      | 0.07   | 0.05    | -       | -       | 0.03    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | < 0.002 | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | 0.3     | -      | -      | -      | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | 2.86    | -      | -      | -      | -      | -      | 3.26   | 3.26    | 3.3     | 1.84    | 3.85    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | 2.44    | -      | -      | -      | -      | -      | 2.72   | 2.89    | 3.22    | 1.57    | 2.44    |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W10 |           |        |        |        |        |        |           |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|--------|--------|--------|--------|-----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |           |        |        |        |        |        |           |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | 0.3       | -      | -      | -      | -      | -      | < 0.2     | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | < 20      | -      | -      | -      | -      | -      | 28        | < 20     | 120       | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | 2.2       | -      | -      | -      | -      | -      | < 1       | 1.3      | 1.3       | 3         | 1         |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | < 2       | -      | -      | -      | -      | -      | 4         | < 2      | 6         | 2         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | < 2       | -      | -      | -      | -      | -      | < 2       | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | 0.01      | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -         | -      | -      | -      | -      | -      | 2,100     | 5,400    | 5,500     | 13,700    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -         | -      | -      | -      | -      | -      | 1,100     | 700      | 1,600     | 2,600     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |           |        |        |        |        |        |           |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |           |        |        |        |        |        |           |          |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | 0.038     | -      | -      | -      | -      | -      | 0.014     | 0.018    | 0.006     | 0.11      | 0.012     |
| antimonio                            | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    |
| arsénico                             | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | 0.011     | -      | -      | -      | -      | -      | 0.011     | 0.011    | 0.011     | 0.0059    | 0.012     |
| berilio                              | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002 | < 0.00004 | 0.00019   | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | 2.72      | -      | -      | -      | -      | -      | 2.43      | 3.01     | 3.06      | 1.04      | 2.51      |
| cromo                                | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | -                          | 0.002     | -      | -      | -      | -      | -      | < 0.001   | 0.001    | 0.0002    | 0.0023    | 0.0071    |
| cobre                                | mg/L        |                                                      |                      | -                          | 0.003     | -      | -      | -      | -      | -      | 0.002     | 0.002    | 0.0016    | 0.0052    | 0.0027    |
| hierro                               | mg/L        |                                                      |                      | -                          | 0.16      | -      | -      | -      | -      | -      | 0.07      | 0.14     | 0.17      | 0.13      | 0.12      |
| plomo                                | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L        |                                                      |                      | -                          | 1.27      | -      | -      | -      | -      | -      | 1.16      | 1.39     | 1.31      | 0.56      | 1.12      |
| manganeso                            | mg/L        |                                                      |                      | -                          | 0.014     | -      | -      | -      | -      | -      | 0.011     | 0.018    | 0.0009    | 0.022     | 0.031     |
| mercurio                             | mg/L        |                                                      |                      | -                          | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |



Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W10 |           |        |        |        |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| molibdeno     | µg/L     |                                                      |                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | < 0.0001  |
| níquel        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.001     |
| fósforo       | mg/L     |                                                      |                      | -                          | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5       | 0.49      | 0.34      | 0.4       |
| selenio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | 6         | -      | -      | -      | -      | -      | 5.1       | 6.4       | 6.64      | 2.98      | 5.15      |
| plata         | mg/L     |                                                      |                      | -                          | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | 2.99      | -      | -      | -      | -      | -      | 3.01      | 3.4       | 3.24      | 1.6       | 2.91      |
| estroncio     | mg/L     |                                                      |                      | -                          | 0.022     | -      | -      | -      | -      | -      | 0.018     | 0.023     | 0.026     | 0.0086    | 0.02      |
| telurio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0005    | 0.0031    | 0.0004    |
| uranio        | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0008    | 0.0005    |
| zinc          | mg/L     |                                                      |                      | -                          | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.003     | 0.004     |
| zirconio      | mg/L     |                                                      |                      | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |           |        |        |        |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | 0.078     | -      | -      | -      | -      | -      | 0.59      | 0.045     | 0.032     | 0.4       | 0.031     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | 0.011     | -      | -      | -      | -      | -      | 0.012     | 0.013     | 0.012     | 0.0095    | 0.012     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00018   | 0.00004   |
| calcio        | mg/L     |                                                      |                      | -                          | 3.13      | -      | -      | -      | -      | -      | 2.68      | 2.86      | 3.39      | 1.07      | 2.39      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | 0.003     | -      | -      | -      | -      | -      | 0.003     | 0.002     | 0.0025    | 0.012     | 0.0026    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | 0.27      | -      | -      | -      | -      | -      | 0.24      | 0.22      | 0.28      | 0.47      | 0.22      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | 0.0002    | 0.0002    |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W10 |           |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio  | mg/L     |                                                      |                      | -                          | 1.21      | -      | -      | -      | -      | -      | 1.27      | 1.36      | 1.68      | 0.61      | 1.11      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | 0.012     | -      | -      | -      | -      | -      | 0.015     | 0.007     | 0.0055    | 0.036     | 0.017     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.4       | 0.48      | 0.37      | 0.38      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | 5.6       | -      | -      | -      | -      | -      | 5.7       | 6.1       | 7.47      | 3.45      | 5.03      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | 2.84      | -      | -      | -      | -      | -      | 3.17      | 3.44      | 3.7       | 1.61      | 2.85      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | 0.021     | -      | -      | -      | -      | -      | 0.02      | 0.022     | 0.028     | 0.0091    | 0.02      |
| telurio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | 0.00004   |
| toro      | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | 0.001     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0043    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.001     | 0.0021    | 0.0006    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.005     | 0.003     |
| zirconio  | mg/L     |                                                      |                      | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.06    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |        |          |           |            |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|----------|-----------|------------|--------|
|                                                               |                                         |                                                      |                      | Mínimo                     | Máximo | Media    | Promedio  | Desv. Est. | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |          |           |            |        |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 22.7                       | 30.6   | 25.6     | 25.634783 | 1.757997   | 23     |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 5.7                        | 7.6    | 6.925    | 6.4       | -          | 18     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 20                         | 197    | 43       | 63.842105 | 51.521585  | 19     |
| redox                                                         | mV                                      |                                                      |                      | 40                         | 327    | 190      | 187.76471 | 90.029529  | 17     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | 0.36                       | 52.5   | 6.55     | 10.790667 | 13.443423  | 15     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |          |           |            |        |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 6.33                       | 7.41   | 7.069942 | 6.927663  | -          | 24     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 19                         | 50     | 42       | 39.729167 | 8.0527867  | 24     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 4.2                        | 14     | 11       | 10.554167 | 2.8193399  | 24     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 5.2                        | 15.4   | 11.85    | 10.666667 | 2.7258292  | 24     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | <10                        | 53     | 38       | 34.166667 | 14.76973   | 24     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | <1                         | 248    | 2.5      | 23.125    | 61.236223  | 24     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 5                          | 20.3   | 11.775   | 11.969583 | 3.3976507  | 24     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 6.1                        | 24.7   | 14.35    | 14.637917 | 4.1319413  | 24     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | <0.5                       | <0.5   | -        | -         | -          | 24     |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | <0.5                       | <0.5   | -        | -         | -          | 24     |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |          |           |            |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | <0.01                      | 0.03   | <0.01    | <0.01     | 0.0068333  | 24     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.03                       | 0.23   | 0.1      | 0.1039583 | 0.0405125  | 24     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.03                       | 0.23   | 0.1      | 0.1069444 | 0.0452164  | 18     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | <0.002                     | 0.003  | <0.002   | <0.002    | 0.0004082  | 24     |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | <0.2                       | 0.4    | <0.2     | <0.2      | 0.0880547  | 24     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |          |           |            |        |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 0.7                        | 4.59   | 3.235    | 3.03125   | 0.8210561  | 24     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | <0.05                      | <0.05  | -        | -         | -          | 24     |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 0.89                       | 5.66   | 3.36     | 3.3658333 | 1.2144597  | 24     |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |          |           |            |        |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | <0.2                       | 0.4    | <0.2     | <0.2      | 0.0880547  | 24     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | <10                        | 120    | 10       | 19.791667 | 23.110282  | 24     |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | <1                         | 3      | 1.4      | 1.4652174 | 0.660997   | 23     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | <2                         | 6      | <2       | 2.1304348 | 1.7915039  | 23     |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |          |            |            |        |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|----------|----------|------------|------------|--------|
|                                      |           |                                                      |                      | Mínimo                     | Máximo   | Media    | Promedio   | Desv. Est. | Conteo |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | <2                         | <2       | -        | -          | -          | 23     |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | <0.001                     | 0.013    | <0.001   | 0.00175    | 0.0032404  | 24     |
| coliformes totales                   | CFU/100mL |                                                      |                      | 800                        | 13,700   | 4,300    | 4,304.1667 | 3,559.6513 | 12     |
| coliformes fecales                   | CFU/100mL |                                                      |                      | 100                        | 2,600    | 1,050    | 1,125      | 772.39298  | 12     |
| Especies de Cianuro                  |           |                                                      |                      |                            |          |          |            |            |        |
| cianuro total                        | mg/L      | 0.001                                                | P                    | <0.002                     | <0.01    | -        | -          | -          | 24     |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | <0.002                     | <0.01    | -        | -          | -          | 24     |
| Metales Disueltos                    |           |                                                      |                      |                            |          |          |            |            |        |
| aluminio                             | mg/L      |                                                      |                      | 0.004                      | 0.23     | 0.014    | 0.0388333  | 0.0568978  | 24     |
| antimonio                            | mg/L      |                                                      |                      | <0.0002                    | 0.0005   | 0.0002   | 0.0002833  | 0.0001926  | 24     |
| arsénico                             | mg/L      |                                                      |                      | <0.0002                    | 0.0005   | <0.0002  | 0.000275   | 0.0001984  | 24     |
| bario                                | mg/L      |                                                      |                      | 0.0039                     | 0.012    | 0.0095   | 0.0090625  | 0.0021139  | 24     |
| berilio                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -        | -          | -          | 24     |
| bismuto                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -        | -          | -          | 24     |
| boro                                 | mg/L      |                                                      |                      | <0.01                      | 0.08     | <0.01    | 0.0158333  | 0.0167245  | 24     |
| cadmio                               | mg/L      |                                                      |                      | <0.00004                   | 0.00019  | 0.00006  | 6.708E-05  | 5.328E-05  | 24     |
| calcio                               | mg/L      |                                                      |                      | 0.83                       | 3.15     | 2.5      | 2.3325     | 0.6695829  | 24     |
| cromo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0005   | <0.0002  | 0.0002708  | 0.0001989  | 24     |
| cobalto                              | mg/L      |                                                      |                      | <0.0002                    | 0.0071   | 0.0007   | 0.0018063  | 0.0021883  | 24     |
| cobre                                | mg/L      |                                                      |                      | 0.0016                     | 0.02     | 0.0051   | 0.0056917  | 0.0043958  | 24     |
| hierro                               | mg/L      |                                                      |                      | <0.03                      | 0.23     | 0.0775   | 0.095625   | 0.0524676  | 24     |
| plomo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0008   | <0.0002  | 0.0002958  | 0.0002255  | 24     |
| litio                                | mg/L      |                                                      |                      | <0.0002                    | 0.001    | 0.00025  | 0.0003667  | 0.0002929  | 24     |
| magnesio                             | mg/L      |                                                      |                      | 0.51                       | 1.53     | 1.24     | 1.1622917  | 0.2875306  | 24     |
| manganeso                            | mg/L      |                                                      |                      | <0.0002                    | 0.049    | 0.0285   | 0.024775   | 0.0129058  | 24     |
| mercurio                             | mg/L      |                                                      |                      | <0.00002                   | <0.00002 | -        | -          | -          | 24     |
| molibdeno                            | µg/L      |                                                      |                      | <0.0001                    | 0.0005   | 0.000275 | 0.0002792  | 0.0001334  | 24     |
| níquel                               | mg/L      |                                                      |                      | <0.0002                    | 0.001    | 0.0005   | 0.0004313  | 0.000271   | 24     |
| fósforo                              | mg/L      |                                                      |                      | <0.03                      | <0.15    | -        | -          | -          | 24     |
| potasio                              | mg/L      |                                                      |                      | 0.33                       | 0.66     | 0.5      | 0.5004167  | 0.0913417  | 24     |
| selenio                              | mg/L      |                                                      |                      | <0.0002                    | <0.001   | -        | -          | -          | 24     |
| silicio                              | mg/L      |                                                      |                      | 2.98                       | 7.2      | 5.7      | 5.47625    | 1.3042166  | 24     |
| plata                                | mg/L      |                                                      |                      | <0.00005                   | <0.00025 | -        | -          | -          | 24     |

Tabla 11 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |         |           |            |        |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|----------|---------|-----------|------------|--------|
|               |          |                                                      |                      | Mínimo                     | Máximo   | Media   | Promedio  | Desv. Est. | Conteo |
| sodio         | mg/L     |                                                      |                      | 1.44                       | 3.4      | 2.975   | 2.8116667 | 0.5521001  | 24     |
| estroncio     | mg/L     |                                                      |                      | 0.0072                     | 0.026    | 0.0195  | 0.0186292 | 0.0049105  | 24     |
| telurio       | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 24     |
| talio         | mg/L     |                                                      |                      | <0.00002                   | <0.0001  | -       | -         | -          | 24     |
| toro          | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -       | -         | -          | 24     |
| estaño        | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 24     |
| titanio       | mg/L     |                                                      |                      | <0.0003                    | 0.0049   | 0.0005  | 0.0010208 | 0.0011762  | 24     |
| uranio        | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -       | -         | -          | 24     |
| vanadio       | mg/L     |                                                      |                      | <0.0002                    | 0.0008   | 0.0005  | 0.0004833 | 0.0001834  | 24     |
| zinc          | mg/L     |                                                      |                      | <0.001                     | 0.007    | 0.003   | 0.00375   | 0.0019337  | 24     |
| zirconio      | mg/L     |                                                      |                      | <0.002                     | <0.01    | -       | -         | -          | 24     |
| Total Metales |          |                                                      |                      |                            |          |         |           |            |        |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.012                      | 1.63     | 0.0825  | 0.2299583 | 0.3577803  | 24     |
| antimonio     | mg/L     | 0.005                                                | P                    | <0.0002                    | <0.001   | -       | -         | -          | 24     |
| arsénico      | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.0005   | 0.0002  | 0.0002917 | 0.0001998  | 24     |
| bario         | mg/L     | 0.7                                                  | P                    | 0.007                      | 0.02     | 0.011   | 0.0112333 | 0.0025703  | 24     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | <0.001   | -       | -         | -          | 24     |
| bismuto       | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -       | -         | -          | 24     |
| boro          | mg/L     | 5                                                    | CCME                 | <0.01                      | 0.08     | 0.015   | 0.0175    | 0.0163521  | 24     |
| cadmio        | mg/L     | 0.003                                                | P                    | <0.00004                   | 0.00018  | 0.0001  | 7.042E-05 | 5.017E-05  | 24     |
| calcio        | mg/L     |                                                      |                      | 0.99                       | 3.39     | 2.45    | 2.2889583 | 0.646324   | 24     |
| cromo         | mg/L     | 0.05                                                 | P                    | <0.0002                    | 0.0008   | 0.0004  | 0.000325  | 0.0002172  | 24     |
| cobalto       | mg/L     |                                                      |                      | <0.0002                    | 0.0028   | 0.0005  | 0.0005042 | 0.0005653  | 24     |
| cobre         | mg/L     | 1                                                    | P                    | 0.002                      | 0.101    | 0.008   | 0.0145292 | 0.0232564  | 24     |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.08                       | 1.85     | 0.22    | 0.340625  | 0.4121743  | 24     |
| plomo         | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.002    | 0.0005  | 0.0004208 | 0.000417   | 24     |
| litio         | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | 0.001    | 0.0005  | 0.0004563 | 0.0002464  | 24     |
| magnesio      | mg/L     |                                                      |                      | 0.61                       | 1.68     | 1.28    | 1.2022917 | 0.2779114  | 24     |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.0055                     | 0.192    | 0.0275  | 0.0365417 | 0.0401386  | 24     |
| mercurio      | mg/L     | 0.001                                                | P                    | <0.00002                   | <0.00002 | -       | -         | -          | 24     |
| molibdeno     | mg/L     | 0.07                                                 | P                    | <0.0001                    | 0.0006   | 0.00025 | 0.0002688 | 0.0001436  | 24     |
| níquel        | mg/L     | 0.02                                                 | P                    | <0.0002                    | 0.0005   | 0.0003  | 0.0003    | 0.0001978  | 24     |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | <0.03                      | <0.15    | -       | -         | -          | 24     |
| potasio       | mg/L     |                                                      |                      | 0.37                       | 0.66     | 0.5     | 0.4991667 | 0.0869241  | 24     |

Tabla 11      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |         |          |           |            |        |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|---------|----------|-----------|------------|--------|
|           |          |                                                      |                      | Mínimo                     | Máximo  | Media    | Promedio  | Desv. Est. | Conteo |
| selenio   | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.002   | 0.0005   | 0.0003833 | 0.0004007  | 24     |
| silicio   | mg/L     |                                                      |                      | 3.41                       | 7.8     | 5.6      | 5.5345833 | 1.2930583  | 24     |
| plata     | mg/L     | 0.05                                                 | P                    | <0.00005                   | 0.0013  | 9.25E-05 | 0.0001269 | 0.0002544  | 24     |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 1.47                       | 3.7     | 3.02     | 2.8672917 | 0.6070115  | 24     |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.0091                     | 0.028   | 0.02     | 0.0190542 | 0.00492    | 24     |
| telurio   | mg/L     |                                                      |                      | <0.0002                    | <0.001  | -        | -         | -          | 24     |
| talio     | mg/L     |                                                      |                      | <0.00001                   | 0.00005 | 0.00001  | 2.396E-05 | 1.989E-05  | 24     |
| toro      | mg/L     |                                                      |                      | <0.0001                    | <0.0005 | -        | -         | -          | 24     |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | <0.0002                    | <0.001  | -        | -         | -          | 24     |
| titanio   | mg/L     |                                                      |                      | <0.0006                    | 0.0096  | 0.0008   | 0.0019125 | 0.0022142  | 24     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | <0.0001                    | <0.0005 | -        | -         | -          | 24     |
| vanadio   | mg/L     |                                                      |                      | <0.0003                    | 0.0054  | 0.0005   | 0.000975  | 0.0010959  | 24     |
| zinc      | mg/L     | 5                                                    | P                    | <0.002                     | 0.013   | 0.003    | 0.00425   | 0.0025918  | 24     |
| zirconio  | mg/L     |                                                      |                      | <0.002                     | <0.12   | -        | -         | -          | 24     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla – Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos se utilizó un valor de la mitad del límite de detección.

<sup>(c)</sup> P: Reglamento panameño 351 Concentraciones máximas permisibles en el agua potable (1999);

AO: Objetivo estético

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la Salud Humana.

CCME: Consejo Canadiense de Ministros del Medio Ambiente, Lineamientos Canadienses para la Salud Humana para la Calidad del Agua Potable en Canadá (2008);

ORNL: Niveles de análisis del agua del grifo del Oak Ridge National Laboratory para contaminantes químicos en sitios del Superfondo (lineamientos ajustados para reflejar un ILCR de 10-5, HQ de 0.2) (Septiembre 2008).

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W9 |          |        |        |        |        |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|----------|--------|--------|--------|--------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |          |        |        |        |        |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 26.5                      | 27       | -      | -      | -      | -      | 23.8    | 25.1   | 25.7    | 24.6    | 24.3    | 25.1    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                       | 6.1      | -      | -      | -      | -      | 6.87    | -      | 7.53    | 7.3     | 6.94    | 7.24    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 40                        | 50       | -      | -      | -      | -      | 46      | 56     | -       | 70      | 30      | 230     |
| redox                                                         | mV                                      |                                                      |                      | 220                       | 181      | -      | -      | -      | -      | -       | 56     | -       | 310     | 185     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -        | -      | -      | -      | -      | 5.3     | 0.97   | -       | 1.07    | 23      | 1.06    |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |          |        |        |        |        |         |        |         |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 7.18                      | 7.414741 | -      | -      | -      | -      | 7.01    | 7.33   | 7.56    | 7.36    | 6.85    | 7.4     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 45                        | 53       | -      | -      | -      | -      | 44      | 56     | 58      | 59      | 30      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 14.5                      | 17.5     | -      | -      | -      | -      | 13.8    | 16     | 20      | 16.7    | 7.9     | 14.8    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 14.5                      | 15.5     | -      | -      | -      | -      | 12.5    | 18     | 16      | 19      | 8.4     | 14.6    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 55                        | 38.5     | -      | -      | -      | -      | 58      | 64     | 59      | 57      | 23      | 41      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 1                         | < 1      | -      | -      | -      | -      | 6       | < 1    | < 1     | 2       | 40      | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 20.1                      | 20.05    | -      | -      | -      | -      | 14.5    | 19.2   | 24.8    | 26.3    | 11.2    | 22.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 24.5                      | 24.45    | -      | -      | -      | -      | 17.6    | 23.4   | 30.2    | 32.1    | 13.7    | 27.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5    | -      | -      | -      | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5    | -      | -      | -      | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |          |        |        |        |        |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01   | -      | -      | -      | -      | < 0.01  | < 0.01 | 0.02    | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.05                      | 0.075    | -      | -      | -      | -      | 0.15    | 0.06   | 0.06    | 0.08    | 0.17    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.05                      | 0.075    | -      | -      | -      | -      | 0.15    | 0.06   | 0.06    | -       | -       | 0.09    |
| Nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002  | -      | -      | -      | -      | < 0.002 | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                     | < 0.2    | -      | -      | -      | -      | < 0.2   | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |          |        |        |        |        |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.7                       | 3.275    | -      | -      | -      | -      | 3.58    | 3.37   | 3.38    | 3.33    | 2.01    | 3.98    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05   | -      | -      | -      | -      | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | < 0.5                     | 1.485    | -      | -      | -      | -      | 1.95    | 2.36   | 1.99    | 1.82    | 1.51    | 1.91    |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W9 |          |        |        |        |        |           |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|---------------------------|----------|--------|--------|--------|--------|-----------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                   | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | < 0.2                     | < 0.2    | -      | -      | -      | -      | < 0.2     | < 0.2    | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | < 20                      | 23       | -      | -      | -      | -      | < 20      | 23       | < 20     | < 20      | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | 2                         | 2.75     | -      | -      | -      | -      | 1.6       | 2.5      | 1.3      | 2.1       | 2.2       | 1.1       |
| aceite y grasa total                 | mg/L        |                                                      |                      | < 2                       | 4        | -      | -      | -      | -      | < 2       | 4        | < 2      | 3         | 10        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | < 2                       | < 2      | -      | -      | -      | -      | < 2       | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | 0.004                     | 0.009    | -      | -      | -      | -      | 0.004     | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                         | -        | -      | -      | -      | -      | -         | 3,800    | 6,500    | 7,000     | 11,200    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                         | -        | -      | -      | -      | -      | -         | 1,700    | 900      | 1,900     | 1,300     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | < 0.01                    | < 0.01   | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | < 0.01                    | < 0.01   | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | 0.037                     | 0.018    | -      | -      | -      | -      | 0.058     | 0.007    | 0.16     | 0.007     | 0.19      | 0.01      |
| antimonio                            | mg/L        |                                                      |                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | 0.0003    | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | 0.022                     | 0.0235   | -      | -      | -      | -      | 0.015     | 0.017    | 0.021    | 0.021     | 0.0096    | 0.019     |
| berilio                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | < 0.01                    | < 0.05   | -      | -      | -      | -      | 0.01      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | < 0.00004                 | < 0.0002 | -      | -      | -      | -      | < 0.00004 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | 3.48                      | 4.225    | -      | -      | -      | -      | 3.26      | 3.71     | 4.73     | 4.07      | 1.75      | 3.58      |
| cromo                                | mg/L        |                                                      |                      | 0.0003                    | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    |
| cobalto                              | mg/L        |                                                      |                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | 0.0011    | < 0.001  | < 0.001  | 0.0055    | 0.0003    | 0.0073    |
| cobre                                | mg/L        |                                                      |                      | 0.0024                    | 0.002    | -      | -      | -      | -      | 0.0024    | 0.001    | 0.001    | 0.0013    | 0.005     | 0.0029    |
| hierro                               | mg/L        |                                                      |                      | 0.12                      | 0.205    | -      | -      | -      | -      | 0.14      | 0.11     | 0.16     | 0.21      | 0.15      | 0.17      |
| plomo                                | mg/L        |                                                      |                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | < 0.0002  | 0.001    | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio                             | mg/L        |                                                      |                      | 1.41                      | 1.59     | -      | -      | -      | -      | 1.38      | 1.59     | 2.05     | 1.58      | 0.86      | 1.42      |
| manganeso                            | mg/L        |                                                      |                      | 0.02                      | 0.0145   | -      | -      | -      | -      | 0.038     | 0.029    | 0.035    | 0.034     | 0.031     | 0.048     |



Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W9 |           |        |        |        |        |           |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| mercurio      | mg/L     |                                                      |                      | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | < 0.00002 | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | 0.0005                    | 0.0006    | -      | -      | -      | -      | 0.0004    | < 0.0005  | 0.0007    | 0.0008    | < 0.0001  | 0.0003    |
| níquel        | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | 0.0002    | < 0.001   | < 0.001   | 0.0008    | < 0.0002  | 0.001     |
| fósforo       | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | -      | -      | -      | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.7                       | 0.8       | -      | -      | -      | -      | 0.67      | 0.6       | 0.7       | 0.76      | 0.46      | 0.6       |
| selenio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 8.96                      | 10.75     | -      | -      | -      | -      | 7.22      | 8.9       | 10.8      | 10.4      | 4.98      | 7.34      |
| plata         | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | 3.74                      | 4.355     | -      | -      | -      | -      | 3.61      | 3.75      | 4.73      | 3.99      | 2.08      | 3.49      |
| estroncio     | mg/L     |                                                      |                      | 0.033                     | 0.0395    | -      | -      | -      | -      | 0.03      | 0.032     | 0.042     | 0.042     | 0.016     | 0.031     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | < 0.00002 | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0008                    | < 0.001   | -      | -      | -      | -      | 0.0018    | < 0.001   | < 0.001   | 0.0006    | 0.0025    | 0.0004    |
| uranio        | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0009                    | < 0.001   | -      | -      | -      | -      | 0.0008    | < 0.001   | < 0.001   | 0.0008    | 0.0008    | 0.0005    |
| zinc          | mg/L     |                                                      |                      | 0.003                     | < 0.005   | -      | -      | -      | -      | 0.002     | < 0.005   | < 0.005   | 0.001     | 0.004     | 0.005     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | < 0.002   | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                           |           |        |        |        |        |           |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.087                     | 0.0355    | -      | -      | -      | -      | 0.18      | 0.22      | 0.029     | 0.027     | 0.42      | 0.025     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.02                      | 0.0215    | -      | -      | -      | -      | 0.017     | 0.019     | 0.023     | 0.024     | 0.016     | 0.019     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | < 0.01                    | < 0.05    | -      | -      | -      | -      | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 3.19                      | 3.8       | -      | -      | -      | -      | 2.83      | 4.13      | 4.1       | 4.41      | 1.8       | 3.46      |
| cromo         | mg/L     | 0.05                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0005    | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | 0.0036                    | 0.002     | -      | -      | -      | -      | 0.0038    | 0.002     | 0.002     | 0.0018    | 0.0097    | 0.002     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W9 |           |        |        |        |        |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | P                    | 0.2                       | 0.27      | -      | -      | -      | -      | 0.25      | 0.24      | 0.43      | 0.34      | 0.37      | 0.23      |
| plomo     | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0003                    | < 0.001   | -      | -      | -      | -      | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | 1.58                      | 1.49      | -      | -      | -      | -      | 1.31      | 1.75      | 1.5       | 1.94      | 0.94      | 1.45      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.012                     | 0.0125    | -      | -      | -      | -      | 0.022     | 0.036     | 0.004     | 0.02      | 0.056     | 0.032     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | 0.0004                    | 0.0006    | -      | -      | -      | -      | 0.0004    | < 0.0005  | < 0.0005  | 0.0006    | < 0.0001  | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | -      | -      | -      | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.65                      | 0.75      | -      | -      | -      | -      | 0.63      | 0.7       | 0.7       | 0.74      | 0.49      | 0.58      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 8.84                      | 10.1      | -      | -      | -      | -      | 6.87      | 9.2       | 9.7       | 11.4      | 5.43      | 7.41      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 4.13                      | 4.025     | -      | -      | -      | -      | 3.42      | 4.07      | 4.6       | 4.63      | 2.14      | 3.37      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.031                     | 0.0365    | -      | -      | -      | -      | 0.026     | 0.035     | 0.042     | 0.043     | 0.016     | 0.032     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0013                    | < 0.001   | -      | -      | -      | -      | 0.003     | < 0.001   | < 0.001   | 0.0008    | 0.0048    | 0.0006    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0009                    | < 0.001   | -      | -      | -      | -      | 0.0009    | < 0.001   | < 0.001   | 0.0008    | 0.002     | 0.0006    |
| zinc      | mg/L     | 5                                                    | P                    | 0.003                     | < 0.005   | -      | -      | -      | -      | 0.002     | < 0.005   | < 0.005   | 0.002     | 0.006     | 0.003     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | < 0.002   | < 0.11    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W3 |         |        |        |        |        |        |        |         |        |         |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|--------|--------|--------|--------|--------|--------|---------|--------|---------|--------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | n/a                       | 24.6    | -      | -      | -      | -      | -      | 25.5   | 26.4    | 25.8   | 24.2    | 25.1   |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                       | 5.9     | -      | -      | -      | -      | -      | -      | 7.47    | 7.5    | 6.6     | 7.3    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | n/a                       | 50      | -      | -      | -      | -      | -      | 51     | -       | 70     | 20      | 494    |
| redox                                                         | mV                                      |                                                      |                      | 210                       | 175     | -      | -      | -      | -      | -      | 114    | -       | 327    | 225     | 60     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | -      | -      | -      | -      | -      | 7.57   | -       | 1.22   | 12.3    | 0.87   |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 7.34                      | 7.2     | -      | -      | -      | -      | -      | 7.33   | 7.6     | 7.57   | 6.73    | 7.58   |
| conductividad                                                 | μS/cm                                   |                                                      |                      | 47                        | 45      | -      | -      | -      | -      | -      | 51     | 56      | 64     | 23      | 56     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 15.9                      | 15      | -      | -      | -      | -      | -      | 13     | 18      | 17.6   | 6.2     | 14.2   |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 15.8                      | 13      | -      | -      | -      | -      | -      | 15     | 18      | 20     | 6.6     | 14.1   |
| total de sólidos disueltos                                    | μS/cm                                   | 500                                                  | P                    | 39                        | 55      | -      | -      | -      | -      | -      | 51     | 62      | 50     | 16      | 62     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 3                         | 5       | -      | -      | -      | -      | -      | 1      | 4       | 2      | 21      | < 1    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 21.6                      | 16.7    | -      | -      | -      | -      | -      | 18.5   | 25      | 30.3   | 8.8     | 25.2   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 26.3                      | 20.3    | -      | -      | -      | -      | -      | 22.5   | 30.5    | 37     | 10.7    | 30.7   |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5  |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5  |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | -      | -      | -      | -      | -      | 0.01   | 0.02    | < 0.01 | < 0.01  | < 0.01 |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                         | 0.2     | -      | -      | -      | -      | -      | 0.08   | 0.06    | 0.1    | 0.14    | 0.05   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.07                      | 0.2     | -      | -      | -      | -      | -      | 0.08   | 0.06    | -      | -       | 0.05   |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | -      | -      | -      | -      | -      | <0.002 | < 0.002 | 0.002  | < 0.002 | 0.003  |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                     | 0.3     | -      | -      | -      | -      | -      | 0.3    | < 0.2   | < 0.2  | < 0.2   | < 0.2  |
| Aniones                                                       |                                         |                                                      |                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.95                      | 2.8     | -      | -      | -      | -      | -      | 3.58   | 3.4     | 3.73   | 1.84    | 4.26   |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05 | < 0.05  | < 0.05 |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 1.23                      | 0.83    | -      | -      | -      | -      | -      | 1.26   | 1.13    | 1.32   | 1.05    | 1.19   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W3 |           |        |        |        |        |        |           |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                           |           |        |        |        |        |        |           |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                         | 0.3       | -      | -      | -      | -      | -      | 0.3       | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | < 20                      | 20        | -      | -      | -      | -      | -      | 26        | < 20     | 72        | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | 1.8                       | 3.8       | -      | -      | -      | -      | -      | 3.6       | 1.4      | 1.8       | 3         | 1.3       |
| aceite y grasa total                 | mg/L        |                                                      |                      | 2                         | 4         | -      | -      | -      | -      | -      | 4         | < 2      | 7         | 9         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | < 2                       | < 2       | -      | -      | -      | -      | -      | < 2       | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | < 0.001                   | 0.006     | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                         | -         | -      | -      | -      | -      | -      | 1,600     | 12,800   | 4,000     | 11,400    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                         | -         | -      | -      | -      | -      | -      | 1,000     | 1,800    | 1,400     | 2,100     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                           |           |        |        |        |        |        |           |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | < 0.01                    | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | < 0.01                    | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                           |           |        |        |        |        |        |           |          |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | 0.026                     | 0.055     | -      | -      | -      | -      | -      | 0.017     | 0.013    | 0.006     | 0.17      | 0.009     |
| antimonio                            | mg/L        |                                                      |                      | 0.0004                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0002    | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | 0.017                     | 0.019     | -      | -      | -      | -      | -      | 0.016     | 0.022    | 0.021     | 0.0095    | 0.021     |
| berilio                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | < 0.01                    | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | 3.91                      | 3.5       | -      | -      | -      | -      | -      | 3.22      | 4.46     | 4.45      | 1.42      | 3.48      |
| cromo                                | mg/L        |                                                      |                      | 0.0003                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | 0.0002    | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | 0.0078                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | 0.0031    | 0.0026    | 0.0003    |
| cobre                                | mg/L        |                                                      |                      | 0.0018                    | 0.002     | -      | -      | -      | -      | -      | 0.002     | 0.002    | 0.0014    | 0.0049    | 0.0019    |
| hierro                               | mg/L        |                                                      |                      | 0.17                      | 0.28      | -      | -      | -      | -      | -      | 0.16      | 0.32     | 0.35      | 0.17      | 0.23      |
| plomo                                | mg/L        |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | 0.0002                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L        |                                                      |                      | 1.5                       | 1.4       | -      | -      | -      | -      | -      | 1.26      | 1.7      | 1.58      | 0.64      | 1.33      |
| manganeso                            | mg/L        |                                                      |                      | 0.023                     | 0.002     | -      | -      | -      | -      | -      | 0.008     | 0.002    | 0.0078    | 0.018     | 0.017     |
| mercurio                             | mg/L        |                                                      |                      | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W3 |           |        |        |        |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| molibdeno     | µg/L     |                                                      |                      | 0.0004                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0006    | < 0.0001  | 0.0003    |
| níquel        | mg/L     |                                                      |                      | 0.001                     | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0003    | < 0.0002  |
| fósforo       | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.72                      | 1         | -      | -      | -      | -      | -      | 0.7       | 0.8       | 0.84      | 0.53      | 0.69      |
| selenio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 10.3                      | 8.8       | -      | -      | -      | -      | -      | 8.7       | 12.5      | 11.9      | 4.63      | 8.33      |
| plata         | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | 4.04                      | 3.86      | -      | -      | -      | -      | -      | 3.96      | 5.22      | 4.65      | 1.95      | 3.94      |
| estroncio     | mg/L     |                                                      |                      | 0.035                     | 0.035     | -      | -      | -      | -      | -      | 0.032     | 0.046     | 0.05      | 0.014     | 0.037     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.001                     | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0006    | 0.0025    | 0.0004    |
| uranio        | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0011                    | 0.001     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.001     | 0.0011    | 0.0005    |
| zinc          | mg/L     |                                                      |                      | 0.003                     | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.003     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                           |           |        |        |        |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.077                     | 0.14      | -      | -      | -      | -      | -      | 0.48      | 0.025     | 0.023     | 0.52      | 0.034     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.016                     | 0.019     | -      | -      | -      | -      | -      | 0.019     | 0.021     | 0.023     | 0.014     | 0.021     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | 0.01                      | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 3.57                      | 3.23      | -      | -      | -      | -      | -      | 3.55      | 4.33      | 4.77      | 1.48      | 3.41      |
| cromo         | mg/L     | 0.05                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0003    | 0.0004    | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | 0.0028                    | 0.003     | -      | -      | -      | -      | -      | 0.003     | 0.001     | 0.0016    | 0.0086    | 0.0019    |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.26                      | 0.45      | -      | -      | -      | -      | -      | 0.31      | 0.22      | 0.5       | 0.45      | 0.41      |
| plomo         | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W3 |           |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0003                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | 1.66                      | 1.29      | -      | -      | -      | -      | -      | 1.37      | 1.72      | 1.95      | 0.69      | 1.35      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.0066                    | 0.013     | -      | -      | -      | -      | -      | 0.011     | 0.004     | 0.0066    | 0.03      | 0.014     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | 0.0004                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | 0.0005    | 0.0007    | < 0.0001  | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.66                      | 0.9       | -      | -      | -      | -      | -      | 0.8       | 0.6       | 0.85      | 0.54      | 0.68      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 10.1                      | 8         | -      | -      | -      | -      | -      | 8.9       | 9         | 13.5      | 5.12      | 8.39      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 4.68                      | 3.56      | -      | -      | -      | -      | -      | 4.31      | 4.2       | 5.55      | 1.97      | 3.92      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.034                     | 0.034     | -      | -      | -      | -      | -      | 0.035     | 0.039     | 0.052     | 0.015     | 0.037     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0018                    | 0.001     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0009    | 0.0063    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0011                    | 0.001     | -      | -      | -      | -      | -      | 0.001     | < 0.001   | 0.001     | 0.0022    | 0.0008    |
| zinc      | mg/L     | 5                                                    | P                    | < 0.001                   | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.004     | 0.001     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.15    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |        |         |          |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | 25.5   | -       | 25.7     | 22.8    | 25.1    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.2      | 7.24    | 7.21    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 47     | -       | 60       | 40      | 507     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 32     | -       | 227      | 238     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 1.14   | -       | 3.1      | 3.43    | 1.78    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | 7.23   | 7.57    | 7.464971 | 7.15    | 7.62    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 48     | 56      | 49.5     | 34      | 53      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 12     | 10      | 10.25    | 7.6     | 10.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 11     | 15      | 11.7     | 7.8     | 10.4    |
| total de sólidos disueltos                                    | μS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 47     | 66      | 34       | 33      | 37      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 1      | < 1     | 4        | 4       | 10      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 18     | 25.6    | 24.4     | 13.5    | 24.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 22     | 31.2    | 29.8     | 16.5    | 29.7    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | < 0.01  | 0.03     | < 0.01  | 0.07    |
| nitrate y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | 0.115    | 0.04    | 0.03    |
| nitrate (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | -        | -       | 0.03    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002  | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.6    | < 0.2   | 0.4      | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |          |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 3.57   | 3.49    | 3.19     | 2.87    | 4.26    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05   | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.67   | < 0.5   | 0.585    | 0.68    | 0.5     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.6      | < 0.2    | 0.4       | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 26       | < 20     | < 20      | < 20     | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 3.7      | 1.8      | 5.9       | 1.9      | 2.3       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -        | 3         | < 2      | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -        | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -        | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2100     | 7900     | 13300     | 18200    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 500      | 1400     | 4900      | 1900     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.022    | 0.015    | 0.025     | 0.061    | 0.018     |
| antimonio                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.025    | 0.021    | 0.024     | 0.015    | 0.026     |
| berilio                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00004  | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2.88     | 2.46     | 2.705     | 1.74     | 2.58      |
| cromo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0007    | 0.0018   | 0.0002    |
| cobre                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.002    | < 0.001  | 0.0034    | 0.0037   | 0.0021    |
| hierro                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.31     | 0.22     | 0.31      | 0.15     | 0.21      |
| plomo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| magnesio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 1.05     | 0.95     | 0.855     | 0.8      | 1.01      |
| manganeso                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.023    | 0.007    | 0.00455   | 0.032    | 0.011     |



Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |             |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-------------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08      | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| mercurio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002   | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005  | 0.00045   | 0.0003    | 0.0003    |
| níquel        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | 0.0002    | 0.0004    | < 0.0002  |
| fósforo       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15      | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.8         | 0.7       | 1.05      | 0.71      | 0.77      |
| selenio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 9.2         | 8.1       | 10.2      | 9.08      | 8.29      |
| plata         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025   | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4.2         | 4.26      | 3.815     | 3.33      | 4.16      |
| estroncio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.038       | 0.032     | 0.043     | 0.021     | 0.036     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001    | < 0.0001  | < 0.00002 | 0.00004   | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | 0.0008    | 0.0006    | 0.0006    |
| uranio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | 0.0008    | 0.0009    | 0.0005    |
| zinc          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005     | < 0.005   | < 0.001   | 0.002     | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01      | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| total metales |          |                                                      |                      |                            |        |        |        |        |        |        |             |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | <b>0.36</b> | 0.028     | 0.0605    | 0.13      | 0.05      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.026       | 0.033     | 0.0285    | 0.015     | 0.026     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.05      | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.0002    | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2.86        | 3.57      | 2.99      | 1.76      | 2.53      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.002       | 0.002     | 0.00245   | 0.0026    | 0.0024    |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.46      | 0.46      | 0.42      | 0.29      | 0.44      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 1.03      | 1.41      | 1.025     | 0.82      | 0.99      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.017     | 0.005     | 0.0029    | 0.0076    | 0.012     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | 0.0006    | 0.0005    | 0.0003    | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.8       | 0.8       | 1.03      | 0.72      | 0.77      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | 0.003     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 9         | 11.7      | 10.6      | 10.1      | 8.13      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | 4.16      | 5.61      | 4.24      | 3.55      | 4.06      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | 0.037     | 0.047     | 0.045     | 0.023     | 0.037     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.00105   | 0.0028    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.00085   | 0.0011    | 0.0007    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.001     | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.21    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |        |         |         |        |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08 | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | 24.7   | 27.9    | 27      | 24.1   | 25.5    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | 7.27    | 7.6     | 6.96   | 7.26    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 98     | -       | 120     | 40     | 516     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 81     | -       | 260     | 168    | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 1.01   | -       | 0.9     | 3.87   | 4.23    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | 7.66   | 7.71    | 7.85    | 7.61   | 7.5     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 98     | 96      | 102     | 40     | 60      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 39     | 52      | 36      | 13.1   | 19.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 37     | 38      | 40.1    | 13.7   | 19.7    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 90     | 76      | 95      | 21     | 68      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 1    | < 1     | < 1     | 2      | 7       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 39.8   | 46.3    | 54.4    | 17.8   | 27.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 48.6   | 56.5    | 66.3    | 21.7   | 33.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5  | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5  | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | 0.02    | 0.03    | < 0.01 | 0.04    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | 0.06    | 0.13   | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | -       | -      | 0.08    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 2    | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.3    | < 0.2   | < 0.2   | < 0.2  | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 3.6    | 3.78    | 3.69    | 2.37   | 4.7     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05 | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.61   | < 0.5   | < 0.5   | 0.74   | 0.66    |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.3      | < 0.2    | < 0.2     | < 200     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 23       | < 20     | 78        | < 20000   | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2.2      | 1.5      | 1.5       | 2.1       | 1.8       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 5        | < 2      | 3         | 10        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 1       | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 1,300    | 20,000   | 4,700     | 2,800     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 700      | 12,000   | 2,700     | 600       | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 2       | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 2       | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005  | 0.017    | 0.007     | 0.14      | 0.039     |
| antimonio                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.013    | 0.021    | 0.019     | 0.0077    | 0.011     |
| berilio                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 6.89     | 6.57     | 7.17      | 2.21      | 3.53      |
| cromo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0004    | 0.0014    | 0.0008    |
| cobalto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.002    | < 0.001  | 0.0037    | 0.0021    | 0.0012    |
| cobre                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | 0.002    | 0.0011    | 0.0022    | 0.0022    |
| hierro                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.06     | 0.34     | 0.25      | 0.22      | 0.14      |
| plomo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 5.35     | 8.65     | 4.39      | 1.85      | 2.6       |
| manganeso                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.018    | 0.019    | 0.017     | 0.01      | 0.018     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| mercurio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0006    | < 0.0001  | < 0.0001  |
| níquel        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0007    | 0.0009    | 0.0006    |
| fósforo       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.5       | 0.8       | 0.72      | 0.41      | 0.46      |
| selenio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 13.5      | 21.4      | 15.6      | 6.42      | 6.75      |
| plata         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4         | 9.41      | 4.34      | 2.15      | 3.02      |
| estroncio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.036     | 0.052     | 0.054     | 0.013     | 0.021     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0007    | 0.0053    | 0.0019    |
| uranio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.002     | 0.002     | 0.0021    | 0.0017    | 0.0012    |
| zinc          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.19      | 0.02      | 0.013     | 0.26      | 0.11      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.015     | 0.02      | 0.019     | 0.0077    | 0.012     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 6.52      | 6.78      | 7.33      | 2.3       | 3.43      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0004    | 0.0017    | 0.0012    |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.001     | 0.001     | 0.0012    | 0.0026    | 0.0022    |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.17      | 0.27      | 0.32      | 0.28      | 0.29      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4.94      | 5         | 5.27      | 1.93      | 2.7       |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.017     | 0.003     | 0.0054    | 0.0073    | 0.025     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | < 0.0005  | 0.0006    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0002    | 0.0007    | 0.0007    |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.5       | 0.7       | 0.73      | 0.42      | 0.45      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 13.2      | 14.7      | 16.8      | 6.86      | 6.87      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | 4.04      | 5.45      | 5.09      | 2.18      | 2.99      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | 0.037     | 0.046     | 0.054     | 0.013     | 0.022     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.0007    | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0075    | 0.0041    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.002     | 0.002     | 0.0019    | 0.0021    | 0.0016    |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.002     | 0.002     |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.20    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W12 |         |        |         |         |        |        |        |                 |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|--------|---------|---------|--------|--------|--------|-----------------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08         | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |                 |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | 24.4    | -      | 24.1    | 24      | -      | -      | 25.4   | 29.7            | 27.5    | 22.8    | 25.5    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                        | 5.6     | -      | 7.23    | 6.4     | -      | -      | -      | 7.41            | 7.7     | 7.24    | 7.24    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 30      | -      | 40      | 60      | -      | -      | 35     | -               | 70      | 40      | 388     |
| redox                                                         | mV                                      |                                                      |                      | -                          | 170     | -      | 177     | -       | -      | -      | 116    | -               | 259     | 253     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -      | 10.21   | -       | -      | -      | 2.35   | -               | 4.69    | 2.1     | 2.86    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |                 |         |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | 7.1     | -      | 6.51    | 7.72    | -      | -      | 7.38   | 7.5898848<br>81 | 7.62    | 7.14    | 7.17    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | 34      | -      | 39      | 87      | -      | -      | 34     | 52              | 62      | 34      | 42      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 10      | -      | 10      | 15      | -      | -      | 8      | 17.5            | 16.6    | 8.8     | 10.7    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 10      | -      | 10      | 16      | -      | -      | 9      | 15.5            | 18.9    | 8.8     | 11.1    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | 41      | -      | 36      | 43      | -      | -      | 45     | 49              | 41      | 28      | 27      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | 10      | -      | 9       | < 1     | -      | -      | 28     | 11              | 3       | 3       | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | 12      | -      | 14.3    | 31.4    | -      | -      | 9.47   | 22.45           | 28      | 11.9    | 13.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | 14.7    | -      | 17.4    | 38.3    | -      | -      | 11.6   | 27.4            | 34.2    | 14.6    | 17      |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5           | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5           | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |        |         |         |        |        |        |                 |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | -      | -      | < 0.01 | 0.03            | < 0.01  | 0.01    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | 0.13    | -      | 0.06    | < 0.05  | -      | -      | 0.06   | < 0.05          | 0.05    | 0.05    | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | 0.13    | -      | 0.06    | < 0.05  | -      | -      | 0.06   | < 0.05          | -       | -       | 0.03    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | -      | -      | <0.002 | 0.003           | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | 0.4     | -      | < 0.2   | < 0.2   | -      | -      | 0.8    | < 0.2           | < 0.2   | < 0.2   | < 0.2   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W12 |          |        |          |          |        |        |          |           |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|----------|--------|----------|----------|--------|--------|----------|-----------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Aniones                              |             |                                                      |                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| cloruro                              | mg/L        | 250                                                  | P                    | -                          | 2.34     | -      | 3.47     | 4.25     | -      | -      | 3.57     | 3.525     | 3.57      | 3.23      | 5.48      |
| fluoruro                             | mg/L        | 1                                                    | P                    | -                          | < 0.05   | -      | < 0.05   | < 0.05   | -      | -      | < 0.05   | < 0.05    | < 0.05    | < 0.05    | < 0.05    |
| sulfato                              | mg/L        | 250                                                  | P                    | -                          | 0.96     | -      | 0.86     | 1.85     | -      | -      | 1.22     | 1.015     | 2.27      | 1.49      | 1.29      |
| Orgánicos                            |             |                                                      |                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | 0.4      | -      | < 0.2    | < 0.2    | -      | -      | 0.8      | < 0.2     | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | < 20     | -      | < 20     | < 20     | -      | -      | 48       | < 20      | 245       | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | 4        | -      | 2.5      | 1.4      | -      | -      | 2.8      | 2.4       | 1.8       | 1.5       | 2.1       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | 3        | < 2       | 5         | 3         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | < 2      | < 2       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | 0.055    | -      | 0.029    | < 0.001  | -      | -      | < 0.001  | < 0.001   | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -      | -      | -        | 4,200     | 2,500     | -         | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -      | -      | -        | 1,700     | 1,100     | -         | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | 0.15     | -      | 0.09     | 0.009    | -      | -      | 0.073    | 0.2       | 0.071     | 0.049     | 0.071     |
| antimonio                            | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | 0.006    | -      | 0.013    | 0.008    | -      | -      | 0.008    | 0.0135    | 0.01      | 0.0061    | 0.0083    |
| berilio                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | < 0.05   | -      | < 0.05   | 0.14     | -      | -      | < 0.05   | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | 2.3      | -      | 2.46     | 3.34     | -      | -      | 1.87     | 4.405     | 4.04      | 1.91      | 2.36      |
| cromo                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | -                          | 0.004    | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | 0.00035   | < 0.0002  | 0.0033    | 0.0002    |
| cobre                                | mg/L        |                                                      |                      | -                          | 0.003    | -      | 0.001    | 0.002    | -      | -      | 0.002    | 0.00165   | 0.001     | 0.0013    | 0.0018    |



Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W12 |           |        |           |           |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| hierro        | mg/L     |                                                      |                      | -                          | 0.23      | -      | 0.24      | 0.06      | -      | -      | 0.11      | 0.315     | 0.17      | 0.07      | 0.13      |
| plomo         | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | -                          | 1.1       | -      | 1.03      | 1.66      | -      | -      | 0.83      | 1.58      | 1.58      | 0.96      | 1.16      |
| manganeso     | mg/L     |                                                      |                      | -                          | 0.006     | -      | 0.009     | 0.005     | -      | -      | 0.007     | 0.011     | 0.0044    | 0.013     | 0.0069    |
| mercurio      | mg/L     |                                                      |                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | 0.0002    | 0.0002    | < 0.0001  | < 0.0001  |
| níquel        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.0003    | < 0.0002  | 0.0005    | < 0.0002  |
| fósforo       | mg/L     |                                                      |                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | 0.5       | -      | 0.6       | 0.5       | -      | -      | 0.5       | 0.79      | 0.63      | 0.43      | 0.42      |
| selenio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | 5.1       | -      | 6.3       | 6.9       | -      | -      | 4.1       | 10.9      | 9.72      | 7.18      | 4.47      |
| plata         | mg/L     |                                                      |                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | 2.49      | -      | 3.2       | 3.66      | -      | -      | 2.8       | 4.73      | 3.81      | 2.79      | 3.37      |
| estroncio     | mg/L     |                                                      |                      | -                          | 0.016     | -      | 0.023     | 0.024     | -      | -      | 0.016     | 0.0375    | 0.035     | 0.014     | 0.019     |
| telurio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | 0.004     | -      | 0.002     | < 0.001   | -      | -      | < 0.001   | 0.00715   | 0.0028    | 0.001     | 0.0011    |
| uranio        | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | 0.001     | -      | 0.001     | < 0.001   | -      | -      | < 0.001   | 0.00155   | 0.0013    | 0.0008    | 0.0006    |
| zinc          | mg/L     |                                                      |                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | -      | -      | < 0.005   | 0.0015    | < 0.001   | 0.002     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | 0.2       | -      | 0.32      | 0.03      | -      | -      | 3.7       | 0.645     | 0.25      | 0.092     | 0.14      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | 0.008     | -      | 0.016     | 0.009     | -      | -      | 0.014     | 0.019     | 0.013     | 0.0067    | 0.01      |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W12 |           |        |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | CCME                 | -                          | < 0.05    | -      | < 0.05    | 0.1       | -      | -      | < 0.05    | 0.09      | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | P                    | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio    | mg/L     |                                                      |                      | -                          | 2.29      | -      | 2.34      | 3.85      | -      | -      | 2.03      | 3.565     | 4.31      | 1.89      | 2.43      |
| cromo     | mg/L     | 0.05                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | P                    | -                          | 0.003     | -      | 0.002     | 0.001     | -      | -      | 0.005     | 0.003     | 0.0016    | 0.0012    | 0.002     |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | 0.32      | -      | 0.46      | 0.11      | -      | -      | 0.45      | 0.765     | 0.36      | 0.16      | 0.27      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.006     | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | 1.11      | -      | 1.01      | 1.64      | -      | -      | 0.9       | 1.56      | 1.99      | 1         | 1.22      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | 0.007     | -      | 0.009     | 0.003     | -      | -      | 0.021     | 0.009     | 0.0047    | 0.0061    | 0.0082    |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | 0.00002   |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | 0.5       | -      | 0.6       | 0.5       | -      | -      | 0.6       | 0.8       | 0.65      | 0.45      | 0.45      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | 5.2       | -      | 6.5       | 7         | -      | -      | 4.3       | 10.75     | 10.9      | 7.48      | 4.97      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | 2.46      | -      | 3.18      | 3.71      | -      | -      | 2.88      | 5.075     | 4.48      | 2.84      | 3.53      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | 0.017     | -      | 0.022     | 0.025     | -      | -      | 0.018     | 0.0365    | 0.037     | 0.014     | 0.02      |
| telurio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | 0.004     | -      | 0.005     | 0.001     | -      | -      | 0.006     | 0.0075    | 0.0044    | 0.0018    | 0.0025    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | 0.002     | -      | 0.002     | < 0.001   | -      | -      | 0.002     | 0.0025    | 0.0017    | 0.001     | 0.001     |
| zinc      | mg/L     | 5                                                    | P                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | -      | -      | 0.01      | 0.012     | 0.002     | 0.001     | < 0.001   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W12 |        |        |        |        |        |        |        |         |         |         |         |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| zirconio  | mg/L     |                                                      |                      | -                          | < 0.01 | -      | < 0.01 | < 0.01 | -      | -      | < 0.05 | < 0.01  | < 0.002 | < 0.002 | < 0.002 |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W13 |         |        |         |         |         |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|--------|---------|---------|---------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08  | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | 25.6    | -      | 25.2    | 25      | 25.6    | -      | 25.4   | 30.9    | 28.6   | 23.7    | 25.7    |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | n/a                        | 5.7     | -      | 7.12    | 6.4     | 7.46    | -      | -      | 7.67    | 7.6    | 7.47    | 7.26    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | 30      | -      | 40      | 60      | 96      | -      | 39     | -       | 70     | 60      | 244     |
| redox                                                         | mV                                      |                                                      |                      | -                          | 176     | -      | 138     | -       | 57      | -      | 111    | -       | 318    | 217     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -      | 6.11    | -       | Missed  | -      | 9.95   | -       | 8.56   | 11.5    | 1.71    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | 6.95    | -      | 6.63    | 7.42    | 7.53    | -      | 7.16   | 7.54    | 7.4    | 6.7     | 7.38    |
| conductividad                                                 | μS/cm                                   |                                                      |                      | -                          | 35      | -      | 44      | 62      | 56      | -      | 41     | 54      | 61     | 21      | 48      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 9       | -      | 11      | 12      | 15      | -      | 9      | 15.6    | 15.4   | 4.7     | 12.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | 9       | -      | 11      | 12      | 15      | -      | 10     | 15      | 17.2   | 5.2     | 12.6    |
| total de sólidos disueltos                                    | μS/cm                                   | 500                                                  | P                    | -                          | 30      | -      | 53      | 60      | 55      | -      | 48     | 51      | 36     | 10      | 32      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | 15      | -      | 4       | 5       | < 1     | -      | 14     | 5       | 45     | 27      | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | 11.1    | -      | 17.9    | 19.9    | 24.1    | -      | 13.4   | 24      | 29.1   | 8       | 21.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | 13.5    | -      | 21.9    | 24.3    | 29.4    | -      | 16.4   | 29.3    | 35.5   | 9.8     | 26.7    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01 | 0.05    | 0.06   | 0.03    | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | 0.24    | -      | 0.05    | < 0.1   | 0.01    | -      | 0.07   | < 0.05  | 0.04   | 0.07    | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | 0.24    | -      | 0.05    | < 0.1   | 0.01    | -      | 0.07   | < 0.05  | -      | -       | 0.03    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | < 0.002 | -      | <0.002 | 0.004   | 0.008  | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | 0.5     | -      | 0.2     | < 0.2   | 0.2     | -      | 1.7    | < 0.2   | 0.3    | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | 3.36    | -      | 3.57    | 4.12    | 4.33    | -      | 3.42   | 3.66    | 3.9    | 1.93    | 4.25    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | < 0.05  | -      | < 0.05  | < 0.1   | < 0.05  | -      | < 0.05 | < 0.05  | < 0.05 | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | 0.94    | -      | 0.72    | < 1     | 0.76    | -      | 0.92   | 0.74    | 0.84   | 0.77    | 0.74    |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W13 |          |        |          |          |          |        |          |           |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|----------|--------|----------|----------|----------|--------|----------|-----------|-----------|----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08   | May-08 | Jun-08   | Sept-08   | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | 0.5      | -      | 0.2      | < 0.2    | 0.2      | -      | 1.7      | < 0.2     | 0.2       | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | 28       | -      | 160      | < 20     | < 20     | -      | 28       | < 20      | 26        | < 20     | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | 5.5      | -      | 1.8      | 1.4      | 1.3      | -      | 5.2      | 1.8       | 2.1       | 3.3      | 1.3       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | 4        | < 2       | 7         | 2        | 3         |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | < 2      | < 2       | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | 0.018    | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001   | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -        | -      | 11,200   | 5,300     | 2,400,000 | 19,000   | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -        | -      | -        | -        | -        | -      | 4,400    | 2,900     | 1,600,000 | 5,700    | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | 0.12     | -      | 0.027    | 0.014    | 0.034    | -      | 0.051    | 0.031     | 0.079     | 0.17     | 0.025     |
| antimonio                            | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | 0.0002   | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | 0.013    | -      | 0.019    | 0.019    | 0.024    | -      | 0.014    | 0.021     | 0.018     | 0.0078   | 0.021     |
| berilio                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | < 0.05   | -      | < 0.05   | < 0.05   | < 0.05   | -      | < 0.05   | < 0.01    | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.0002 | -      | < 0.0002 | < 0.00004 | < 0.00004 | 0.00017  | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | 2.3      | -      | 2.77     | 2.9      | 3.59     | -      | 2.23     | 3.74      | 3.65      | 1.1      | 3         |
| cromo                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | -                          | 0.008    | -      | 0.001    | < 0.001  | < 0.001  | -      | 0.001    | 0.0006    | < 0.0002  | 0.0063   | 0.0027    |
| cobre                                | mg/L        |                                                      |                      | -                          | 0.003    | -      | 0.001    | 0.001    | 0.001    | -      | 0.002    | 0.0014    | 0.0015    | 0.0032   | 0.002     |
| hierro                               | mg/L        |                                                      |                      | -                          | 0.26     | -      | 0.21     | 0.26     | 0.19     | -      | 0.15     | 0.37      | 0.29      | 0.18     | 0.28      |
| plomo                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | 0.0002    |
| magnesio                             | mg/L        |                                                      |                      | -                          | 0.85     | -      | 1.02     | 1.14     | 1.52     | -      | 0.87     | 1.52      | 1.51      | 0.49     | 1.23      |
| manganeso                            | mg/L        |                                                      |                      | -                          | 0.037    | -      | 0.008    | 0.026    | 0.007    | -      | 0.009    | 0.027     | 0.0008    | 0.019    | 0.024     |

Tabla 12 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W13 |           |        |           |           |           |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| mercurio      | mg/L     |                                                      |                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0003    | 0.0004    | < 0.0001  | < 0.0001  |
| níquel        | mg/L     |                                                      |                      | -                          | 0.001     | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | 0.0006    | 0.001     | 0.0004    |
| fósforo       | mg/L     |                                                      |                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | 0.9       | -      | 0.7       | 0.8       | 0.8       | -      | 0.8       | 0.85      | 0.85      | 0.55      | 0.74      |
| selenio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | 5.1       | -      | 8         | 9.8       | 11.2      | -      | 6.7       | 10.6      | 11.7      | 4.68      | 8.88      |
| plata         | mg/L     |                                                      |                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | 3.24      | -      | 3.72      | 4.04      | 5.47      | -      | 3.29      | 4.92      | 5.12      | 2.01      | 4.39      |
| estroncio     | mg/L     |                                                      |                      | -                          | 0.021     | -      | 0.03      | 0.033     | 0.047     | -      | 0.025     | 0.042     | 0.043     | 0.012     | 0.036     |
| telurio       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | 0.002     | -      | 0.001     | < 0.001   | < 0.001   | -      | < 0.001   | 0.0011    | 0.0021    | 0.0028    | 0.001     |
| uranio        | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | 0.002     | -      | < 0.001   | 0.001     | < 0.001   | -      | < 0.001   | 0.0011    | 0.0012    | 0.0012    | 0.0008    |
| zinc          | mg/L     |                                                      |                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | 0.002     | 0.003     | 0.003     | 0.002     |
| zirconio      | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |           |        |           |           |           |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | 0.3       | -      | 0.067     | 0.11      | 0.072     | -      | 3         | 0.093     | 0.27      | 0.41      | 0.07      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | 0.016     | -      | 0.019     | 0.017     | 0.022     | -      | 0.021     | 0.022     | 0.025     | 0.012     | 0.021     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | < 0.05    | -      | < 0.05    | < 0.05    | < 0.05    | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | 2.22      | -      | 2.83      | 2.95      | 3.48      | -      | 2.52      | 3.69      | 4.12      | 1.16      | 2.97      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | 0.004     | -      | 0.002     | 0.002     | 0.001     | -      | 0.003     | 0.002     | 0.0023    | 0.0047    | 0.0019    |
| hierro        | mg/L     | 0.3                                                  | P                    | -                          | 0.57      | -      | 0.33      | 0.35      | 0.26      | -      | 0.54      | 0.48      | 0.63      | 0.37      | 0.43      |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W13 |           |        |           |           |           |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | < 0.001   | -      | < 0.001   | 0.001     | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | 0.94      | -      | 1.01      | 1.18      | 1.58      | -      | 0.96      | 1.38      | 1.68      | 0.56      | 1.25      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | 0.026     | -      | 0.007     | 0.012     | 0.005     | -      | 0.019     | 0.008     | 0.024     | 0.013     | 0.012     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | 0.0002    |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | 1         | -      | 0.7       | 0.7       | 0.8       | -      | 0.8       | 0.8       | 0.9       | 0.55      | 0.72      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | 0.001     | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | 5.2       | -      | 7.8       | 9.9       | 12        | -      | 7.2       | 10.4      | 12.9      | 4.98      | 8.74      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | 3.22      | -      | 3.69      | 4.04      | 5.44      | -      | 3.58      | 4.66      | 5.6       | 2.01      | 4.37      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | 0.023     | -      | 0.029     | 0.034     | 0.044     | -      | 0.028     | 0.042     | 0.05      | 0.013     | 0.036     |
| telurio   | mg/L     |                                                      |                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | 0.006     | -      | 0.002     | 0.002     | 0.002     | -      | 0.007     | 0.002     | 0.0046    | 0.0067    | 0.0016    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | 0.002     | -      | < 0.001   | 0.001     | < 0.001   | -      | 0.002     | 0.001     | 0.002     | 0.002     | 0.001     |
| zinc      | mg/L     | 5                                                    | P                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | < 0.005   | 0.004     | 0.001     | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.16    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | -      | 28.8    | 27.6   | 24.4    | 26      |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | 7.24    | 7.6    | 6.7     | 6.99    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7,600  | 70      | 427     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 218    | 254     | 150     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.34   | 8.24    | 1.69    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.56   | 6.6     | 7.29    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6,730  | 64      | 129     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 647    | 9.2     | 18.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 649    | 9.7     | 17.9    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,660  | 33      | 74      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7      | 9       | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 38     | 8.5     | 21.2    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 46.4   | 10.4    | 25.9    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.06   | 0.02    | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04   | 0.11    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002  | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.5    | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2,010  | 12.4    | 27.7    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 257    | 3       | 3.71    |



Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 172       | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.9       | 3.2       | 2.3       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9         | 3         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4,500     | 14,000    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5,600     | 1,700     | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.006     | 0.14      | 0.027     |
| antimonio                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.025     | 0.011     | 0.02      |
| berilio                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.29      | 0.01      | 0.01      |
| cadmio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44.3      | 1.52      | 3.26      |
| cromo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | < 0.0002  | 0.0002    |
| cobalto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0039    | 0.0029    |
| cobre                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0013    | 0.0035    | 0.0013    |
| hierro                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.35      | 0.25      |
| plomo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.012     | 0.0002    | 0.0004    |
| magnesio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 130       | 1.31      | 2.48      |
| manganeso                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.034     | 0.025     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| mercurio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | µg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014    | < 0.0001  | < 0.0001  |
| níquel        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0006    | 0.0004    |
| fósforo       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 39.3      | 0.79      | 1.16      |
| selenio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.1      | 4.81      | 7.86      |
| plata         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,030     | 8.27      | 15.7      |
| estroncio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.858     | 0.017     | 0.042     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0037    | 0.0006    |
| uranio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | 0.0012    | 0.0008    |
| zinc          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.002     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.17      | 0.39      | 0.082     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.026     | 0.014     | 0.02      |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.32      | 0.01      | 0.01      |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44        | 1.62      | 3.17      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0003    | 0.0002    |
| cobalto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.001     | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0018    | 0.0045    | 0.0016    |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.46      | 0.81      | 0.37      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013     | 0.0003    | 0.0004    |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 131       | 1.37      | 2.42      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.03      | 0.058     | 0.014     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0001  | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 39.8      | 0.76      | 1.13      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.5      | 5.06      | 7.82      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,030     | 8.06      | 16.1      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.881     | 0.02      | 0.041     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0028    | 0.0062    | 0.0021    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016    | 0.0017    | 0.001     |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.003     | 0.001     |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |        |        |          |            |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|----------|------------|--------|
|                                                               |                                         |                                                      |                      | Mínimo                     | Máximo | Media  | Promedio | Desv. Est. | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |          |            |        |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 22.8                       | 30.9   | 25.45  | 25.6341  | 1.69238    | 44     |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 5.6                        | 7.7    | 7.24   | 6.6      | -          | 37     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 20                         | 7,600  | 60     | 316.684  | 1222.14    | 38     |
| redox                                                         | mV                                      |                                                      |                      | 32                         | 327    | 176    | 168.943  | 84.4947    | 35     |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | 0.87                       | 23     | 3.265  | 4.90433  | 4.87369    | 30     |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |          |            |        |
| pH                                                            | unidades pH                             | 6.5 - 8.5                                            | P                    | 6.51                       | 7.85   | 7.38   | 7.17463  | -          | 45     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 21                         | 6,730  | 52     | 202.3    | 995.425    | 45     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 4.7                        | 647    | 14.2   | 29.0344  | 94.5932    | 45     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 5.2                        | 649    | 14.5   | 29.0733  | 94.7942    | 45     |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 10                         | 3,660  | 48     | 127.767  | 538.819    | 45     |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | <1                         | 45     | 3      | 7.2      | 10.1115    | 45     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 8                          | 54.4   | 21.2   | 21.7082  | 9.70846    | 45     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 9.8                        | 66.3   | 25.9   | 26.4878  | 11.8388    | 45     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | <0.5                       | <0.5   | -      | -        | -          | 45     |
| alcalinidad de hidróxido                                      | mg/L como OH <sup>-</sup>               |                                                      |                      | <0.5                       | <0.5   | -      | -        | -          | 45     |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |          |            |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | <0.01                      | 0.07   | <0.01  | 0.01489  | 0.01707    | 45     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | <0.01                      | 0.24   | 0.06   | 0.07102  | 0.05027    | 44     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | <0.01                      | 0.24   | 0.05   | 0.06452  | 0.05198    | 31     |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | <0.002                     | 1      | <0.002 | 0.02356  | 0.14887    | 45     |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | <0.2                       | 1.7    | <0.2   | 0.21556  | 0.27712    | 45     |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |          |            |        |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 1.84                       | 2,010  | 3.57   | 48.7951  | 299.029    | 45     |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | <0.05                      | <0.5   | -      | -        | -          | 45     |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | <0.5                       | 257    | 0.96   | 6.84611  | 38.145     | 45     |
| Orgánicos                                                     |                                         |                                                      |                      |                            |        |        |          |            |        |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | <0.2                       | 100    | <0.2   | 2.48409  | 15.0455    | 44     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | <10                        | 10,000 | 10     | 250.067  | 1487.24    | 45     |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | 1.1                        | 5.9    | 2.1    | 2.36778  | 1.12468    | 45     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | <2                         | 10     | <2     | 2.93182  | 2.66238    | 44     |

**Tabla 12**
**Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)**

| Parámetro                            | Unidades  | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |           |          |          |            |        |
|--------------------------------------|-----------|------------------------------------------------------|----------------------|----------------------------|-----------|----------|----------|------------|--------|
|                                      |           |                                                      |                      | Mínimo                     | Máximo    | Media    | Promedio | Desv. Est. | Conteo |
| aceite y grasa en hidrocarburos      | mg/L      |                                                      |                      | <2                         | <2        | -        | -        | -          | 44     |
| fenoles totales                      | mg/L      | 0.001                                                | P                    | <0.001                     | 0.5       | <0.001   | 0.01461  | 0.07548    | 44     |
| coliformes totales                   | CFU/100mL |                                                      |                      | 1,300                      | 2,400,000 | 6750     | 107888   | 488251     | 24     |
| coliformes fecales                   | CFU/100mL |                                                      |                      | 500                        | 1,600,000 | 1750     | 69162.5  | 326077     | 24     |
| <b>Especies de Cianuro</b>           |           |                                                      |                      |                            |           |          |          |            |        |
| cianuro total                        | mg/L      | 0.001                                                | P                    | <0.002                     | <2        | -        | -        | -          | 45     |
| cianuro disociable en ácidos débiles | mg/L      |                                                      |                      | <0.002                     | <2        | -        | -        | -          | 45     |
| <b>Metales Disueltos</b>             |           |                                                      |                      |                            |           |          |          |            |        |
| aluminio                             | mg/L      |                                                      |                      | <0.005                     | 0.2       | 0.031    | 0.05703  | 0.05746    | 45     |
| antimonio                            | mg/L      |                                                      |                      | <0.0002                    | 0.0005    | 0.0002   | 0.00028  | 0.00019    | 45     |
| arsénico                             | mg/L      |                                                      |                      | <0.0002                    | 0.0015    | <0.0002  | 0.0003   | 0.00027    | 45     |
| bario                                | mg/L      |                                                      |                      | 0.006                      | 0.026     | 0.018    | 0.01649  | 0.00585    | 45     |
| berilio                              | mg/L      |                                                      |                      | <0.0002                    | <0.001    | -        | -        | -          | 45     |
| bismuto                              | mg/L      |                                                      |                      | <0.0002                    | <0.001    | -        | -        | -          | 45     |
| boro                                 | mg/L      |                                                      |                      | <0.01                      | 0.29      | 0.01     | 0.02267  | 0.0459     | 45     |
| cadmio                               | mg/L      |                                                      |                      | <0.00004                   | 0.00017   | <0.00004 | 5.8E-05  | 4.3E-05    | 45     |
| calcio                               | mg/L      |                                                      |                      | 1.1                        | 44.3      | 3.26     | 4.20056  | 6.25362    | 45     |
| cromo                                | mg/L      |                                                      |                      | <0.0002                    | 0.0014    | 0.0004   | 0.00035  | 0.00026    | 45     |
| cobalto                              | mg/L      |                                                      |                      | <0.0002                    | 0.008     | 0.0006   | 0.00183  | 0.00217    | 45     |
| cobre                                | mg/L      |                                                      |                      | <0.001                     | 0.005     | 0.002    | 0.00199  | 0.00101    | 45     |
| hierro                               | mg/L      |                                                      |                      | <0.01                      | 0.37      | 0.21     | 0.20611  | 0.08593    | 45     |
| plomo                                | mg/L      |                                                      |                      | <0.0002                    | <0.001    | -        | -        | -          | 45     |
| litio                                | mg/L      |                                                      |                      | <0.0002                    | 0.012     | 0.0002   | 0.00057  | 0.00176    | 45     |
| magnesio                             | mg/L      |                                                      |                      | 0.49                       | 130       | 1.4      | 4.503    | 19.1821    | 45     |
| manganeso                            | mg/L      |                                                      |                      | 0.0008                     | 0.048     | 0.017    | 0.01775  | 0.01177    | 45     |
| mercurio                             | mg/L      |                                                      |                      | <0.00002                   | <0.00002  | -        | -        | -          | 45     |
| molibdeno                            | µg/L      |                                                      |                      | <0.0001                    | 0.0014    | 0.00025  | 0.0003   | 0.00025    | 45     |
| níquel                               | mg/L      |                                                      |                      | <0.0002                    | 0.001     | 0.0005   | 0.00048  | 0.00025    | 45     |
| fósforo                              | mg/L      |                                                      |                      | <0.03                      | <0.15     | -        | -        | -          | 45     |
| potasio                              | mg/L      |                                                      |                      | 0.41                       | 39.3      | 0.71     | 1.55778  | 5.75656    | 45     |
| selenio                              | mg/L      |                                                      |                      | <0.0002                    | 0.002     | <0.0002  | 0.0003   | 0.00033    | 45     |
| silicio                              | mg/L      |                                                      |                      | 4.1                        | 21.4      | 8.8      | 8.84778  | 3.23716    | 45     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |          |          |          |            |        |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|----------|----------|----------|------------|--------|
|               |          |                                                      |                      | Mínimo                     | Máximo   | Media    | Promedio | Desv. Est. | Conteo |
| plata         | mg/L     |                                                      |                      | <0.00005                   | <0.00025 | -        | -        | -          | 45     |
| sodio         | mg/L     |                                                      |                      | 1.95                       | 1030     | 3.94     | 27.046   | 152.925    | 45     |
| estroncio     | mg/L     |                                                      |                      | 0.012                      | 0.858    | 0.033    | 0.05002  | 0.1237     | 45     |
| telurio       | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -        | -        | -          | 45     |
| talio         | mg/L     |                                                      |                      | <0.00002                   | 0.00005  | <0.00002 | 2.8E-05  | 2E-05      | 45     |
| toro          | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -        | -        | -          | 45     |
| estaño        | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -        | -        | -          | 45     |
| titanio       | mg/L     |                                                      |                      | <0.0004                    | 0.00715  | 0.0006   | 0.00135  | 0.00142    | 45     |
| uranio        | mg/L     |                                                      |                      | <0.0001                    | <0.0005  | -        | -        | -          | 45     |
| vanadio       | mg/L     |                                                      |                      | <0.0005                    | 0.0021   | 0.0008   | 0.00094  | 0.00046    | 45     |
| zinc          | mg/L     |                                                      |                      | <0.001                     | 0.005    | 0.0025   | 0.00213  | 0.00095    | 45     |
| zirconio      | mg/L     |                                                      |                      | <0.002                     | <0.01    | -        | -        | -          | 45     |
| Total Metales |          |                                                      |                      |                            |          |          |          |            |        |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.013                      | 3.7      | 0.11     | 0.31011  | 0.68479    | 45     |
| antimonio     | mg/L     | 0.005                                                | P                    | <0.0002                    | <0.001   | -        | -        | -          | 45     |
| arsénico      | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.0015   | <0.0002  | 0.00032  | 0.00027    | 45     |
| bario         | mg/L     | 0.7                                                  | P                    | 0.0067                     | 0.033    | 0.019    | 0.01834  | 0.00567    | 45     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | <0.001   | -        | -        | -          | 45     |
| bismuto       | mg/L     |                                                      |                      | <0.0002                    | <0.001   | -        | -        | -          | 45     |
| boro          | mg/L     | 5                                                    | CCME                 | <0.01                      | 0.32     | 0.01     | 0.02478  | 0.04898    | 45     |
| cadmio        | mg/L     | 0.003                                                | P                    | <0.00004                   | <0.0002  | -        | -        | -          | 45     |
| calcio        | mg/L     |                                                      |                      | 1.16                       | 44       | 3.23     | 4.21256  | 6.20169    | 45     |
| cromo         | mg/L     | 0.05                                                 | P                    | <0.0002                    | 0.0017   | 0.0005   | 0.00038  | 0.0003     | 45     |
| cobalto       | mg/L     |                                                      |                      | <0.0002                    | 0.001    | 0.0005   | 0.00033  | 0.00022    | 45     |
| cobre         | mg/L     | 1                                                    | P                    | 0.001                      | 0.0097   | 0.002    | 0.00262  | 0.00173    | 45     |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.11                       | 0.81     | 0.36     | 0.37389  | 0.14483    | 45     |
| plomo         | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.006    | 0.0003   | 0.00042  | 0.00087    | 45     |
| litio         | mg/L     | 0.0146                                               | ORNL                 | <0.0002                    | 0.013    | 0.0004   | 0.00064  | 0.0019     | 45     |
| magnesio      | mg/L     |                                                      |                      | 0.56                       | 131      | 1.38     | 4.50811  | 19.312     | 45     |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.0029                     | 0.058    | 0.012    | 0.01506  | 0.01254    | 45     |
| mercurio      | mg/L     | 0.001                                                | P                    | <0.00002                   | 0.00002  | <0.00002 | <0.00002 | 1.5E-06    | 45     |
| molibdeno     | mg/L     | 0.07                                                 | P                    | <0.0001                    | 0.0015   | 0.00025  | 0.00031  | 0.00025    | 45     |
| níquel        | mg/L     | 0.02                                                 | P                    | <0.0002                    | 0.0007   | 0.0005   | 0.00033  | 0.0002     | 45     |

Tabla 12      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Estadística <sup>(b)</sup> |         |          |          |            |        |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|---------|----------|----------|------------|--------|
|           |          |                                                      |                      | Mínimo                     | Máximo  | Media    | Promedio | Desv. Est. | Conteo |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | <0.03                      | <0.15   | -        | -        | -          | 45     |
| potasio   | mg/L     |                                                      |                      | 0.42                       | 39.8    | 0.7      | 1.56444  | 5.83151    | 45     |
| selenio   | mg/L     | 0.01                                                 | P                    | <0.0002                    | 0.003   | <0.0002  | 0.0004   | 0.00052    | 45     |
| silicio   | mg/L     |                                                      |                      | 4.3                        | 16.8    | 8.84     | 8.90044  | 2.8372     | 45     |
| plata     | mg/L     | 0.05                                                 | P                    | <0.00005                   | 0.0005  | <0.00005 | 0.00008  | 8.1E-05    | 45     |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 1.97                       | 1,030   | 4.06     | 27.086   | 152.918    | 45     |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.013                      | 0.881   | 0.035    | 0.05109  | 0.12701    | 45     |
| telurio   | mg/L     |                                                      |                      | <0.0002                    | <0.001  | -        | -        | -          | 45     |
| talio     | mg/L     |                                                      |                      | <0.00001                   | <0.0001 | -        | -        | -          | 45     |
| toro      | mg/L     |                                                      |                      | <0.0001                    | 0.0007  | <0.0001  | 0.00015  | 0.00013    | 45     |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | <0.0002                    | 0.002   | <0.0002  | 0.00032  | 0.00032    | 45     |
| titanio   | mg/L     |                                                      |                      | <0.0006                    | 0.0075  | 0.002    | 0.00267  | 0.00228    | 45     |
| uranio    | mg/L     | 0.02                                                 | CCME                 | <0.0001                    | 0.00025 | <0.0001  | 0.00015  | 0.0001     | 45     |
| vanadio   | mg/L     |                                                      |                      | <0.0006                    | 0.0025  | 0.001    | 0.00126  | 0.00062    | 45     |
| zinc      | mg/L     | 5                                                    | P                    | <0.001                     | 0.012   | 0.0025   | 0.00256  | 0.00213    | 45     |
| zirconio  | mg/L     |                                                      |                      | <0.002                     | <0.21   | -        | -        | -          | 45     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla – Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos se utilizó un valor de la mitad del límite de detección.

<sup>(c)</sup> P: Reglamento panameño 351 Concentraciones máximas permisibles en el agua potable (1999);

AO: Objetivo estético

0.3 - denota una excedencia por encima de los criterios seleccionados asociados a la Salud Humana.

CCME: Consejo Canadiense de Ministros del Medio Ambiente, Lineamientos Canadienses para la Salud Humana para la Calidad del Agua Potable en Canadá (2008);

ORNL: Niveles de análisis del agua del grifo del Oak Ridge National Laboratory para contaminantes químicos en sitios del Superfondo (lineamientos ajustados para reflejar un ILCR de 10-5, HQ de 0.2) (Septiembre 2008).

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base de Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W17 |         |          |         |         |        |        |        |         |         |          |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|----------|---------|---------|--------|--------|--------|---------|---------|----------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07   | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08   | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 25.3                       | 25      | 24.5     | 23.5    | 24.5    | -      | -      | 25.4   | 26.3    | 29.3    | 23.8     | 25      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                        | 6.2     | 7.11     | 7.05    | 7.1     | -      | -      | -      | 7.19    | 7.2     | 7        | 7.5     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                         | 60      | 50       | 50      | 60      | -      | -      | 61     | -       | 80      | 30       | 209     |
| redox                                                         | mV                                      |                                                      |                      | 186                        | 180     | 201      | 176     | -       | -      | -      | 92     | -       | 264     | 244      | Na      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | 3.21     | 27.5    | -       | -      | -      | 0.57   | -       | 0.57    | 21.4     | 1.37    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.07                       | 7.66    | 6.962673 | 6.45    | 6.82    | -      | -      | 7.28   | 7.42    | 7.49    | 6.669885 | 7.35    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 52                         | 67      | 46.5     | 43      | 58      | -      | -      | 61     | 59      | 64      | 25.5     | 53      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.5                       | 19      | 14.5     | 11      | 16      | -      | -      | 17     | 18      | 16.3    | 6.55     | 14.7    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 15.1                       | 19      | 13.1     | 11      | 15      | -      | -      | 18     | 17      | 18.1    | 6.85     | 14.3    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 51                         | 54      | 46.5     | 29      | 31      | -      | -      | 53     | 36      | 55      | 15.5     | 51      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | < 1                        | < 1     | 6.5      | 14      | 1       | -      | -      | < 1    | < 1     | < 1     | 12.5     | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 16.1                       | 20      | 14.35    | 12.4    | 21.6    | -      | -      | 15.9   | 19.4    | 21.8    | 7.5      | 18.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 19.7                       | 24.4    | 17.45    | 15.1    | 26.3    | -      | -      | 19.4   | 23.7    | 26.5    | 9.1      | 22.9    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                      | < 0.5   | < 0.5    | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5    | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                      | < 0.5   | < 0.5    | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5    | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                     | < 0.01  | < 0.01   | < 0.01  | < 0.01  | -      | -      | < 0.01 | < 0.01  | < 0.01  | 0.03     | 0.17    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.09                       | 0.07    | 0.11     | 0.23    | 0.07    | -      | -      | 0.05   | 0.06    | 0.05    | 0.155    | 0.05    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.09                       | 0.07    | 0.11     | 0.23    | 0.07    | -      | -      | 0.05   | 0.06    | -       | -        | 0.05    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                    | < 0.002 | < 0.002  | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002  | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                      | 0.2     | < 0.2    | 0.2     | < 0.2   | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2    | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 3.31                       | 3.71    | 3.265    | 3.38    | 3.95    | -      | -      | 3.7    | 3.87    | 3.73    | 2.1      | 4.09    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                     | < 0.05  | < 0.05   | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05   | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 5                          | 5.09    | 4.05     | 3.18    | 4.83    | -      | -      | 6.96   | 5.69    | 6.74    | 2.325    | 4.53    |



Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W17 |              |           |          |          |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------------|-----------|----------|----------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07       | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |              |           |          |          |        |        |          |          |           |          |           |
| Nitrógeno orgánico total             | mg/L        |                                                      |                      | < 0.2                      | 0.2          | < 0.2     | 0.2      | < 0.2    | -      | -      | < 0.2    | < 0.2    | < 0.2     | < 0.2    | < 0.2     |
| Demanda química de oxígeno           | mg/L        |                                                      |                      | 32                         | 33           | < 20      | < 20     | 24       | -      | -      | 31       | < 20     | < 20      | < 20     | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | 1.3                        | < 1          | 1.2       | 2.3      | < 1      | -      | -      | 1.8      | 1.1      | 1.2       | 2.8      | 1.1       |
| aceite y grasa total                 | mg/L        |                                                      |                      | < 2                        | < 2          | < 2       | 5        | < 2      | -      | -      | 3        | < 2      | 3         | 3        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | < 2                        | < 2          | < 2       | < 2      | < 2      | -      | -      | < 2      | < 2      | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | < 0.001                    | <b>0.037</b> | < 0.001   | < 0.001  | < 0.001  | -      | -      | -        | < 0.001  | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -            | -         | -        | -        | -      | -      | 1,500    | 1,800    | 5,500     | 6,400    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -            | -         | -        | -        | -      | -      | 200      | 1,200    | 1,000     | 1,400    | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |              |           |          |          |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | < 0.01                     | < 0.01       | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | < 0.01                     | < 0.01       | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |              |           |          |          |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      |                      | 0.076                      | 0.042        | 0.086     | 0.13     | 0.045    | -      | -      | 0.045    | 0.035    | 0.01      | 0.175    | 0.044     |
| antimonio                            | mg/L        |                                                      |                      | 0.0002                     | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | 0.0002    |
| arsénico                             | mg/L        |                                                      |                      | < 0.0002                   | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | 0.016                      | 0.019        | 0.0145    | 0.015    | 0.018    | -      | -      | 0.017    | 0.018    | 0.017     | 0.00865  | 0.017     |
| berilio                              | mg/L        |                                                      |                      | < 0.0002                   | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | < 0.0002                   | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | < 0.01                     | < 0.05       | 0.02      | < 0.05   | < 0.05   | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | < 0.00004                  | < 0.0002     | < 0.00004 | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00018  | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | 4                          | 4.64         | 3.225     | 2.73     | 3.77     | -      | -      | 4.15     | 4.42     | 4.38      | 1.46     | 3.6       |
| cromo                                | mg/L        |                                                      |                      | 0.0003                     | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      |                      | 0.0028                     | 0.002        | 0.0007    | 0.002    | 0.006    | -      | -      | < 0.001  | < 0.001  | 0.0009    | 0.00095  | 0.0045    |
| cobre                                | mg/L        |                                                      |                      | 0.0049                     | 0.009        | 0.0115    | 0.011    | 0.007    | -      | -      | 0.01     | 0.013    | 0.0055    | 0.0145   | 0.014     |
| hierro                               | mg/L        |                                                      |                      | 0.08                       | 0.1          | 0.095     | 0.19     | 0.11     | -      | -      | 0.06     | 0.1      | 0.06      | 0.19     | 0.09      |
| plomo                                | mg/L        |                                                      |                      | < 0.0002                   | < 0.001      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | 0.0003                     | < 0.001      | 0.0003    | < 0.001  | < 0.001  | -      | -      | 0.001    | < 0.001  | < 0.0002  | < 0.0002 | 0.0003    |
| magnesio                             | mg/L        |                                                      |                      | 1.57                       | 1.78         | 1.555     | 1.06     | 1.55     | -      | -      | 1.56     | 1.79     | 1.31      | 0.695    | 1.38      |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W17 |           |           |           |           |        |        |             |           |           |              |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|-----------|-----------|-----------|--------|--------|-------------|-----------|-----------|--------------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08      | Sept-08   | Oct-08    | Nov-08       | Feb-09    |
| manganeso     | mg/L     |                                                      |                      | 0.016                      | 0.012     | 0.0123    | 0.017     | 0.026     | -      | -      | 0.01        | 0.021     | 0.012     | 0.0115       | 0.022     |
| mercurio      | mg/L     |                                                      |                      | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002   | <0.00002  | < 0.00002 | < 0.00002    | < 0.00002 |
| molibdeno     | ug/L     |                                                      |                      | 0.0006                     | 0.0007    | 0.00045   | < 0.0005  | 0.0007    | -      | -      | 0.001       | 0.0008    | 0.0008    | 0.0002       | 0.0004    |
| níquel        | mg/L     |                                                      |                      | 0.0005                     | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | 0.0004       | 0.0006    |
| fósforo       | mg/L     |                                                      |                      | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15      | < 0.15    | < 0.03    | < 0.03       | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.67                       | 0.7       | 0.67      | 0.8       | 0.6       | -      | -      | 0.6         | 0.7       | 0.64      | 0.54         | 0.64      |
| selenio       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 8.46                       | 9.4       | 6.4       | 4.9       | 7.8       | -      | -      | 7.7         | 8.6       | 8.52      | 4.065        | 6.81      |
| plata         | mg/L     |                                                      |                      | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025   | < 0.00025 | < 0.00005 | < 0.00005    | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | 4.01                       | 4.34      | 5.05      | 3         | 4.08      | -      | -      | 3.88        | 4.57      | 3.51      | 1.995        | 3.52      |
| estroncio     | mg/L     |                                                      |                      | 0.031                      | 0.036     | 0.026     | 0.022     | 0.034     | -      | -      | 0.033       | 0.035     | 0.04      | 0.0125       | 0.03      |
| telurio       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.0001    | < 0.0001  | < 0.00002 | < 0.00002    | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005    | < 0.0005  | < 0.0001  | < 0.0001     | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0012                     | < 0.001   | 0.0017    | 0.003     | < 0.001   | -      | -      | < 0.001     | < 0.001   | 0.0003    | 0.00325      | 0.0006    |
| uranio        | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005    | < 0.0005  | < 0.0001  | < 0.0001     | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0007                     | < 0.001   | 0.00055   | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | 0.0006    | 0.0007       | 0.0004    |
| zinc          | mg/L     |                                                      |                      | 0.003                      | < 0.005   | 0.0025    | < 0.005   | < 0.005   | -      | -      | < 0.005     | < 0.005   | < 0.001   | 0.0035       | 0.006     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.01      | < 0.01    | < 0.002   | < 0.002      | < 0.002   |
| total metales |          |                                                      |                      |                            |           |           |           |           |        |        |             |           |           |              |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.13                       | 0.074     | -         | 0.19      | 0.13      | -      | -      | <b>0.49</b> | 0.058     | 0.042     | <b>0.335</b> | 0.065     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.014                      | 0.019     | 0.015     | 0.017     | 0.018     | -      | -      | 0.017       | 0.018     | 0.019     | 0.00985      | 0.017     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | < 0.0002     | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | < 0.01                     | < 0.05    | < 0.01    | < 0.05    | < 0.05    | -      | -      | < 0.05      | < 0.05    | < 0.01    | < 0.01       | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | -      | -      | < 0.0002    | < 0.0002  | < 0.00004 | 0.00017      | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 3.4                        | 4.54      | 3.025     | 2.68      | 3.67      | -      | -      | 4.41        | 4.17      | 4.67      | 1.52         | 3.47      |
| cromo         | mg/L     | 0.05                                                 | P                    | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | -      | < 0.001     | < 0.001   | < 0.0002  | 0.0002       | < 0.0002  |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W17 |           |           |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|-----------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | P                    | 0.0074                     | 0.012     | 0.016     | 0.016     | 0.009     | -      | -      | 0.013     | 0.017     | 0.013     | 0.018     | 0.015     |
| hierro    | mg/L     | 0.3                                                  | P                    | 0.12                       | 0.16      | 0.21      | 0.27      | 0.22      | -      | -      | 0.14      | 0.16      | 0.15      | 0.3       | 0.13      |
| plomo     | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0003                     | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio  | mg/L     |                                                      |                      | 1.61                       | 1.74      | 1.34      | 1.08      | 1.52      | -      | -      | 1.64      | 1.5       | 1.56      | 0.74      | 1.37      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.009                      | 0.008     | 0.02      | 0.017     | 0.017     | -      | -      | 0.01      | 0.015     | 0.013     | 0.0114    | 0.014     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | 0.0005                     | 0.0007    | 0.0004    | < 0.0005  | 0.0007    | -      | -      | 0.0007    | 0.0006    | 0.0008    | 0.00025   | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.59                       | 0.7       | 0.615     | 0.8       | 0.6       | -      | -      | 0.7       | 0.6       | 0.63      | 0.57      | 0.58      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 7.87                       | 9.2       | 6.22      | 4.9       | 7.6       | -      | -      | 7.7       | 7.4       | 8.96      | 4.445     | 6.62      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 4.12                       | 4.28      | 3.275     | 3.14      | 4         | -      | -      | 4.03      | 4.03      | 3.97      | 2.11      | 3.35      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.028                      | 0.036     | 0.024     | 0.022     | 0.033     | -      | -      | 0.034     | 0.034     | 0.041     | 0.013     | 0.029     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0024                     | < 0.001   | 0.0018    | 0.002     | 0.001     | -      | -      | < 0.001   | < 0.001   | 0.0005    | 0.00575   | 0.0005    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0006                     | < 0.001   | 0.0008    | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0006    | 0.00115   | 0.0004    |
| zinc      | mg/L     | 5                                                    | P                    | 0.001                      | < 0.005   | 0.003     | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.0035    | 0.003     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.02    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W5 |         |         |         |         |        |         |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08  | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 26.5                      | 26      | 24.2    | 25.2    | 24      | -      | 26.8    | 25.6    | 28.5    | 28.1    | 24.2    | 25.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                       | 6.85    | 7.21    | 7.51    | 7.7     | -      | 7.67    | -       | 7.82    | 8.27    | 7.3     | 6.9     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 70      | 40      | 50      | 80      | -      | 68      | 70      | -       | 90      | 50      | 280     |
| redox                                                         | mV                                      |                                                      |                      | 225                       | 184     | 181     | 177     | -       | -      | -       | 101     | -       | 283     | 189     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 11      | 61      | -       | -      | 4.74    | 5.88    | -       | 1.9     | 3.75    | 28.4    |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.22                      | 7.53    | 6.94    | 6.59    | 7.54    | -      | 7.21    | 7.44    | 7.68    | 7.71    | 7.35    | 7.45    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 76      | 41      | 51      | 82      | -      | 64      | 68      | 72      | 80      | 44      | 56      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 22.1                      | 27      | 13      | 16      | 23      | -      | 21.8    | 22      | 24.7    | 26      | 13.2    | 16.9    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 17.8                      | 26      | 13.3    | 16      | 23      | -      | 20.4    | 23      | 25      | 30.1    | 13.8    | 17      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 67                        | 61      | 32      | 49      | 61      | -      | 64      | 63      | 63      | 59      | 38      | 50      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 6                         | 1       | 8       | 58      | < 1     | -      | 3       | 4       | < 1     | < 1     | 2       | 30      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 18.2                      | 25.8    | 13.6    | 16.6    | 26.9    | -      | 19.4    | 20.4    | 25.9    | 31.8    | 15      | 22.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 22.2                      | 31.5    | 16.6    | 20.3    | 32.8    | -      | 23.6    | 24.9    | 31.6    | 38.7    | 18.3    | 27.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01  | < 0.01  | 0.02    | < 0.01  | < 0.01  | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.16                      | 0.08    | 0.16    | 0.14    | 0.06    | -      | 0.11    | 0.07    | < 0.05  | 0.05    | 0.11    | 0.06    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.16                      | 0.08    | 0.16    | 0.14    | 0.06    | -      | 0.11    | 0.07    | < 0.05  | -       | -       | 0.06    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | -      | < 0.002 | <0.002  | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | 0.2                       | 0.2     | 0.2     | < 0.2   | < 0.2   | -      | < 0.2   | 0.2     | 0.2     | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.8                       | 3.59    | 2.62    | 3.43    | 3.8     | -      | 4.05    | 3.59    | 3.79    | 3.8     | 3.08    | 4.31    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | -      | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 3.6                       | 5.04    | 3.01    | 3.5     | 4.91    | -      | 5.21    | 5.97    | 5.64    | 6.7     | 3.1     | 3.26    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | 0.2                       | 0.2     | 0.2     | < 0.2   | < 0.2   | -      | < 0.2   | 0.2     | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | < 20                      | 23      | < 20    | < 20    | < 20    | -      | < 20    | 28      | < 20    | 90      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | 2.6                       | 1.5     | 2.5     | 1.9     | < 1     | -      | 1.3     | < 1     | 1.6     | 1.3     | 2.2     | 1.6     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | 2       | -      | < 2     | 4       | < 2     | 5       | 7       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | < 2     | -      | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | < 0.001                   | 0.005   | < 0.001 | < 0.001 | < 0.001 | -      | 0.003   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -      | -       | 3,100   | 1,100   | 12,000  | 5,900   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -      | -       | 1,000   | 500     | 3,600   | 600     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01  | < 0.01  | < 0.01  | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01  | < 0.01  | < 0.01  | < 0.002 | < 0.002 | < 0.002 |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W5 |           |           |           |           |        |           |           |           |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                           |           |           |           |           |        |           |           |           |           |           |           |
| aluminio          | mg/L     |                                                      |                      | 0.13                      | 0.049     | 0.18      | 0.18      | 0.035     | -      | 0.052     | 0.026     | 0.016     | 0.009     | 0.032     | 0.025     |
| antimonio         | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | 0.0003    | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | 0.011                     | 0.012     | 0.0083    | 0.008     | 0.014     | -      | 0.012     | 0.01      | 0.012     | 0.014     | 0.0088    | 0.011     |
| berilio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | 0.01                      | < 0.05    | < 0.01    | < 0.05    | 0.06      | -      | < 0.01    | < 0.05    | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | -      | < 0.00004 | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | 5.6                       | 6.1       | 2.74      | 3.6       | 5.06      | -      | 4.44      | 4.77      | 5.46      | 6.09      | 2.71      | 3.69      |
| cromo             | mg/L     |                                                      |                      | 0.0004                    | < 0.001   | 0.0004    | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    | 0.0003    |
| cobalto           | mg/L     |                                                      |                      | 0.0005                    | < 0.001   | 0.0004    | 0.004     | 0.001     | -      | 0.0016    | 0.002     | < 0.0002  | 0.0067    | 0.0002    | 0.0004    |
| cobre             | mg/L     |                                                      |                      | 0.005                     | 0.004     | 0.0063    | 0.005     | 0.006     | -      | 0.0038    | 0.004     | 0.0053    | 0.0032    | 0.0061    | 0.0049    |
| hierro            | mg/L     |                                                      |                      | 0.21                      | 0.21      | 0.21      | 0.26      | 0.15      | -      | 0.15      | 0.12      | 0.16      | 0.16      | 0.08      | 0.08      |
| plomo             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | 0.001     | 0.0002    | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | 1.96                      | 2.91      | 1.5       | 1.72      | 2.59      | -      | 2.06      | 2.35      | 2.7       | 2.62      | 1.57      | 1.86      |
| manganeso         | mg/L     |                                                      |                      | 0.016                     | 0.016     | 0.019     | 0.027     | 0.019     | -      | 0.018     | 0.017     | 0.012     | 0.022     | 0.033     | 0.039     |
| mercurio          | mg/L     |                                                      |                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | ug/L     |                                                      |                      | 0.0004                    | 0.0007    | 0.0003    | < 0.0005  | 0.0009    | -      | 0.0007    | 0.0006    | 0.0008    | 0.0009    | 0.0003    | 0.0004    |
| níquel            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | 0.0004    | < 0.001   | < 0.0002  | 0.0008    | < 0.0002  | 0.0002    |
| fósforo           | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | 0.73                      | 0.8       | 0.61      | 0.7       | 0.6       | -      | 0.87      | 0.7       | 0.67      | 0.72      | 0.53      | 0.61      |
| selenio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | 7.51                      | 10.8      | 5.86      | 6.6       | 8.9       | -      | 8.31      | 8.2       | 9.17      | 10.6      | 7.66      | 6.7       |
| plata             | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | 3.46                      | 4.36      | 2.6       | 3.1       | 3.9       | -      | 3.97      | 3.75      | 4.14      | 4.03      | 2.86      | 3.22      |
| estroncio         | mg/L     |                                                      |                      | 0.028                     | 0.041     | 0.019     | 0.023     | 0.037     | -      | 0.036     | 0.031     | 0.038     | 0.046     | 0.019     | 0.027     |
| telurio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | 0.0033                    | < 0.001   | 0.0051    | 0.003     | < 0.001   | -      | 0.0021    | 0.001     | 0.0004    | 0.0005    | 0.0009    | 0.0009    |
| uranio            | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | 0.0013                    | 0.001     | 0.0011    | 0.001     | < 0.001   | -      | 0.0019    | < 0.001   | 0.001     | 0.0014    | 0.0006    | 0.0007    |
| zinc              | mg/L     |                                                      |                      | 0.002                     | < 0.005   | 0.002     | < 0.005   | < 0.005   | -      | 0.002     | < 0.005   | 0.003     | < 0.001   | 0.003     | 0.001     |
| zirconio          | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Total Metales     |          |                                                      |                      |                           |           |           |           |           |        |           |           |           |           |           |           |
| aluminio          | mg/L     | 0.2                                                  | P                    | 0.27                      | 0.098     | 0.35      | 0.77      | 0.088     | -      | 0.15      | 1.2       | 0.026     | 0.027     | 0.07      | 0.31      |
| antimonio         | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     | 0.7                                                  | P                    | 0.0093                    | 0.013     | 0.01      | 0.017     | 0.013     | -      | 0.013     | 0.013     | 0.014     | 0.016     | 0.0092    | 0.015     |
| berilio           | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W5 |           |           |           |           |        |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | CCME                 | 0.01                      | < 0.05    | < 0.01    | < 0.05    | 0.06      | -      | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | -      | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio    | mg/L     |                                                      |                      | 3.49                      | 5.82      | 2.87      | 3.44      | 5.09      | -      | 4.47      | 5.09      | 5.44      | 6.56      | 2.88      | 3.69      |
| cromo     | mg/L     | 0.05                                                 | P                    | 0.0003                    | < 0.001   | 0.0005    | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | 0.0004    |
| cobalto   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0004    |
| cobre     | mg/L     | 1                                                    | P                    | 0.0081                    | 0.005     | 0.0087    | 0.014     | 0.007     | -      | 0.0065    | 0.009     | 0.005     | 0.0049    | 0.0067    | 0.011     |
| hierro    | mg/L     | 0.3                                                  | P                    | 0.31                      | 0.31      | 0.35      | 0.65      | 0.25      | -      | 0.24      | 0.38      | 0.21      | 0.26      | 0.17      | 0.41      |
| plomo     | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0002                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | 2.2                       | 2.78      | 1.5       | 1.72      | 2.59      | -      | 2.25      | 2.49      | 2.78      | 3.33      | 1.61      | 1.88      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.01                      | 0.014     | 0.019     | 0.05      | 0.017     | -      | 0.0099    | 0.018     | 0.004     | 0.0043    | 0.033     | 0.047     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | 0.0004                    | 0.0007    | 0.0004    | < 0.0005  | 0.0008    | -      | 0.0006    | 0.0007    | 0.0007    | 0.001     | 0.0003    | 0.0006    |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.66                      | 0.7       | 0.62      | 0.8       | 0.7       | -      | 0.81      | 0.7       | 0.7       | 0.75      | 0.57      | 0.63      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 7.63                      | 10.1      | 5.72      | 6.6       | 9.1       | -      | 8.18      | 8.6       | 9.4       | 12        | 8.02      | 6.78      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 3.67                      | 4.17      | 2.58      | 3.26      | 3.95      | -      | 3.79      | 3.92      | 4.64      | 4.87      | 3         | 3.22      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.024                     | 0.039     | 0.019     | 0.024     | 0.036     | -      | 0.031     | 0.034     | 0.037     | 0.049     | 0.02      | 0.028     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0031                    | 0.001     | 0.0039    | 0.006     | 0.001     | -      | 0.0029    | 0.001     | < 0.001   | 0.0008    | 0.0013    | 0.0023    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0014                    | 0.001     | 0.0014    | 0.003     | 0.001     | -      | 0.0012    | 0.001     | < 0.001   | 0.0014    | 0.0008    | 0.0013    |
| zinc      | mg/L     | 5                                                    | P                    | 0.002                     | < 0.005   | 0.002     | < 0.005   | < 0.005   | -      | 0.002     | < 0.005   | < 0.005   | 0.002     | 0.003     | 0.003     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.07    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                          | -      | -      | -      | -      | -      | -      | 26.4   | -       | 26.3    | 24.5    | 25      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.4     | 6.93    | 7.46    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 69     | -       | 100     | 40      | 196     |
| redox                                                         | mV                                      |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 108    | -       | 261     | 223     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 6.76   | -       | 0.99    | 34      | 3.37    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | -                          | -      | -      | -      | -      | -      | -      | 7.47   | -       | 7.71    | 6.86    | 7.57    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 67     | -       | 85      | 28      | 64      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 21     | -       | 26.2    | 8.5     | 20.2    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 22     | -       | 28      | 8.6     | 20.5    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 61     | -       | 78      | 21      | 39      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4      | -       | < 1     | 33      | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 21.7   | -       | 36.2    | 10      | 27.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 26.5   | -       | 44.2    | 12.2    | 33.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | -       | < 0.01  | 0.02    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.08   | -       | 0.04    | 0.13    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.08   | -       | -       | -       | 0.04    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.2  | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 3.64   | -       | 3.8     | 2.02    | 4.09    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 4.52   | -       | 5.46    | 1.8     | 3.3     |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |          |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|---------|-----------|-----------|-----------|
|                                      |             |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.2    | -       | 0.3       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 26       | -       | < 20      | < 20      | < 10      |
| carbono disuelto total               | mg/L como C |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 1      | -       | 2.7       | 3.6       | 1.5       |
| aceite y grasa total                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 5        | -       | 4         | < 2       | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | -        | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 5,000    | -       | 5,300     | 6,700     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2,700    | -       | 600       | 900       | -         |
| Especies de Cianuro                  |             |                                                      |                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| aluminio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.029    | -       | 0.005     | 0.14      | 0.021     |
| antimonio                            | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.011    | -       | 0.015     | 0.0065    | 0.012     |
| berilio                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4.73     | -       | 6.47      | 1.77      | 4.62      |
| cromo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | 0.0004    | 0.0003    |
| cobalto                              | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | 0.0004    | 0.0032    | 0.0031    |
| cobre                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.004    | -       | 0.0022    | 0.0074    | 0.0055    |
| hierro                               | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.1      | -       | 0.16      | 0.17      | 0.19      |
| plomo                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio                             | mg/L        |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2.24     | -       | 2.43      | 0.98      | 2.11      |



Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |           |         |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|---------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| manganeso     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.01      | -       | 0.01      | 0.026     | 0.031     |
| mercurio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | ug/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | -       | 0.0008    | < 0.0001  | 0.0004    |
| níquel        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0007    | 0.0006    |
| fósforo       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.7       | -       | 0.7       | 0.5       | 0.59      |
| selenio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 8.2       | -       | 10        | 4.7       | 7.74      |
| plata         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 3.62      | -       | 3.85      | 2.02      | 3.56      |
| estroncio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.032     | -       | 0.051     | 0.013     | 0.034     |
| telurio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001  | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | 0.0006    | 0.0031    | 0.0007    |
| uranio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | 0.0012    | 0.0009    | 0.0008    |
| zinc          | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | -       | < 0.001   | 0.008     | 0.003     |
| zirconio      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01    | -       | < 0.002   | < 0.002   | < 0.002   |
| Total Metales |          |                                                      |                      |                            |        |        |        |        |        |        |           |         |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 1.4       | -       | 0.016     | 0.4       | 0.066     |
| antimonio     | mg/L     | 0.005                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.013     | -       | 0.017     | 0.01      | 0.013     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.05    | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.0002  | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 4.87      | -       | 6.5       | 1.75      | 4.63      |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |           |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|---------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0005    | 0.0002    |
| cobalto   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0003    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.006     | -       | 0.0029    | 0.011     | 0.0057    |
| hierro    | mg/L     | 0.3                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.31      | -       | 0.25      | 0.39      | 0.32      |
| plomo     | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 2.35      | -       | 2.85      | 1.02      | 2.18      |
| manganeso | mg/L     | 0.1                                                  | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.016     | -       | 0.0039    | 0.025     | 0.028     |
| mercurio  | mg/L     | 0.001                                                | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | -       | 0.0008    | < 0.0001  | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.7       | -       | 0.69      | 0.52      | 0.59      |
| selenio   | mg/L     | 0.01                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 8.1       | -       | 10.4      | 4.83      | 7.62      |
| plata     | mg/L     | 0.05                                                 | P                    | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | -                          | -      | -      | -      | -      | -      | -      | 3.77      | -       | 4.31      | 2.03      | 3.48      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | 0.034     | -       | 0.05      | 0.013     | 0.034     |
| telurio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.003     | -       | 0.0008    | 0.0042    | 0.0009    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | 0.001     | -       | 0.0011    | 0.0017    | 0.001     |
| zinc      | mg/L     | 5                                                    | P                    | -                          | -      | -      | -      | -      | -      | -      | 0.008     | -       | 0.001     | 0.002     | 0.002     |
| zirconio  | mg/L     |                                                      |                      | -                          | -      | -      | -      | -      | -      | -      | < 0.08    | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W18 |         |         |         |        |        |        |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|----------------------------|---------|---------|---------|--------|--------|--------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                    | Oct-07  | Nov-07  | Dic-07  | Ene-08 | Mar-08 | May-08 | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                            |         |         |         |        |        |        |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 25                         | 27      | 24.6    | 24.1    | 24.5   | -      | -      | 25.3    | 26      | 27      | 24.7    | 23      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                        | -       | 7.1     | 7.39    | 7.4    | -      | -      | -       | 7.51    | 7.6     | 7.24    | 7.77    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                         | 50      | 40      | 50      | 60     | -      | -      | 53      | -       | 60      | 40      | 198     |
| redox                                                         | mV                                      |                                                      |                      | 210                        | 170     | 188     | 161     | -      | -      | -      | 106     | -       | 319     | 232     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                          | -       | -       | 3.88    | -      | -      | -      | 0.5     | -       | 0.95    | 4.34    | 0.57    |
| Parámetros Generales                                          |                                         |                                                      |                      |                            |         |         |         |        |        |        |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.26                       | 7.43    | 6.71    | 6.62954 | -      | -      | -      | 7.38    | 7.54    | 7.53    | 7.24    | 7.52    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 48                         | 53      | 36      | 48      | -      | -      | -      | 53      | 52      | 54      | 43      | 52      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.9                       | 18      | 11.1    | 14.5    | -      | -      | -      | 15      | 18      | 15.6    | 10.4    | 14.3    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.9                       | 17      | 11.1    | 14      | -      | -      | -      | 17      | 16      | 18.5    | 10.7    | 14.2    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 55                         | 51      | 36      | 38      | -      | -      | -      | 51      | 53      | 44      | 33      | 50      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | < 1                        | < 1     | 16      | < 1     | -      | -      | -      | < 1     | < 1     | 1       | 5       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 21.2                       | 19.7    | 12.5    | 18.5    | -      | -      | -      | 18.7    | 21.2    | 24.6    | 15.7    | 23.1    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 25.9                       | 24      | 15.2    | 22.6    | -      | -      | -      | 22.8    | 25.8    | 30      | 19.2    | 28.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                      | < 0.5   | < 0.5   | < 0.5   | -      | -      | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                      | < 0.5   | < 0.5   | < 0.5   | -      | -      | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                            |         |         |         |        |        |        |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                     | < 0.01  | < 0.01  | < 0.01  | -      | -      | -      | < 0.01  | < 0.01  | 0.01    | 0.05    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.11                       | 0.11    | 0.24    | 0.14    | -      | -      | -      | 0.08    | 0.08    | 0.11    | 0.18    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.11                       | 0.11    | 0.24    | 0.14    | -      | -      | -      | 0.08    | 0.08    | -       | -       | 0.08    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                    | < 0.002 | < 0.002 | < 0.002 | -      | -      | -      | <0.002  | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                      | < 0.2   | < 0.2   | < 0.2   | -      | -      | -      | 0.5     | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                            |         |         |         |        |        |        |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 3.17                       | 3.36    | 2.61    | 3.285   | -      | -      | -      | 3.37    | 3.55    | 3.46    | 2.81    | 3.68    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                     | < 0.05  | < 0.05  | < 0.05  | -      | -      | -      | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 2.14                       | 1.61    | 1.74    | 1.975   | -      | -      | -      | 2.28    | 2.18    | 2.08    | 1.8     | 2.09    |
| Orgánicos                                                     |                                         |                                                      |                      |                            |         |         |         |        |        |        |         |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | < 0.2                      | < 0.2   | < 0.2   | < 0.2   | -      | -      | -      | 0.5     | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | < 20                       | < 20    | < 20    | < 20    | -      | -      | -      | 23      | < 20    | 44      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | < 1                        | < 1     | 1.6     | < 1     | -      | -      | -      | 1.8     | < 1     | 3.1     | < 1     | < 1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | < 2                        | < 2     | < 2     | < 2     | -      | -      | -      | 4       | < 2     | 8       | 3       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                        | < 2     | < 2     | < 2     | -      | -      | -      | < 2     | < 2     | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | 0.003                      | 0.011   | < 0.001 | < 0.001 | -      | -      | -      | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                          | -       | -       | -       | -      | -      | -      | 4,100   | 2,200   | 2,700   | 4,000   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                          | -       | -       | -       | -      | -      | -      | 1,600   | 1,500   | 600     | 1,000   | -       |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W18 |           |           |           |        |        |        |           |           |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|-----------|-----------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                            |           |           |           |        |        |        |           |           |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | < 0.01                     | < 0.01    | < 0.01    | < 0.01    | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | < 0.01                     | < 0.01    | < 0.01    | < 0.01    | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                            |           |           |           |        |        |        |           |           |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | 0.008                      | 0.007     | 0.12      | 0.007     | -      | -      | -      | 0.009     | 0.014     | 0.002     | 0.045     | 0.006     |
| antimonio                            | mg/L     |                                                      |                      | 0.0002                     | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | 0.018                      | 0.015     | 0.013     | 0.017     | -      | -      | -      | 0.014     | 0.017     | 0.016     | 0.014     | 0.017     |
| berilio                              | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | < 0.01                     | < 0.05    | 0.01      | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | < 0.00004                  | < 0.0002  | < 0.00004 | < 0.0002  | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L     |                                                      |                      | 3.91                       | 3.98      | 2.52      | 3.4       | -      | -      | -      | 3.3       | 3.98      | 3.52      | 2.26      | 3.26      |
| cromo                                | mg/L     |                                                      |                      | 0.0002                     | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L     |                                                      |                      | 0.0023                     | 0.005     | 0.0031    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0024    | 0.0017    |
| cobre                                | mg/L     |                                                      |                      | 0.0003                     | < 0.001   | 0.0014    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.0003    | 0.0009    | 0.0014    |
| hierro                               | mg/L     |                                                      |                      | 0.02                       | < 0.05    | 0.14      | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | 0.05      | 0.02      |
| plomo                                | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | 0.0002                     | < 0.001   | 0.0002    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| magnesio                             | mg/L     |                                                      |                      | 1.73                       | 1.88      | 1.17      | 1.465     | -      | -      | -      | 1.58      | 1.97      | 1.65      | 1.16      | 1.48      |
| manganeso                            | mg/L     |                                                      |                      | 0.015                      | 0.023     | 0.018     | 0.0125    | -      | -      | -      | 0.016     | 0.016     | 0.0071    | 0.022     | 0.017     |
| mercurio                             | mg/L     |                                                      |                      | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | ug/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | 0.0004                     | 0.002     | 0.0005    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.0003    |
| fósforo                              | mg/L     |                                                      |                      | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | 0.72                       | 0.7       | 0.67      | 0.7       | -      | -      | -      | 0.6       | 0.7       | 0.65      | 0.57      | 0.56      |
| selenio                              | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | 8.5                        | 8.8       | 5.03      | 6.6       | -      | -      | -      | 7         | 8.6       | 8.38      | 6.26      | 6.68      |
| plata                                | mg/L     |                                                      |                      | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | 3.55                       | 3.9       | 3.34      | 3.2       | -      | -      | -      | 3.28      | 4.25      | 3.54      | 2.58      | 3.06      |
| estroncio                            | mg/L     |                                                      |                      | 0.031                      | 0.031     | 0.02      | 0.026     | -      | -      | -      | 0.026     | 0.032     | 0.032     | 0.019     | 0.028     |
| telurio                              | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro                                 | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | 0.0004                     | < 0.001   | 0.006     | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.0004    | 0.0016    | 0.0004    |
| uranio                               | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | 0.0009                     | < 0.001   | 0.0011    | < 0.001   | -      | -      | -      | < 0.001   | 0.001     | 0.001     | 0.0007    | 0.0006    |
| zinc                                 | mg/L     |                                                      |                      | 0.003                      | < 0.005   | 0.003     | < 0.005   | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio                             | mg/L     |                                                      |                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W18 |           |           |           |        |        |        |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|----------------------------|-----------|-----------|-----------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                            |           |           |           |        |        |        |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.02                       | 0.015     | 0.22      | 0.022     | -      | -      | -      | 0.12      | 0.014     | 0.009     | 0.12      | 0.012     |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.016                      | 0.015     | 0.016     | 0.017     | -      | -      | -      | 0.017     | 0.017     | 0.018     | 0.014     | 0.017     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | < 0.01                     | < 0.05    | < 0.01    | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                  | < 0.0002  | < 0.00004 | < 0.0002  | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 3.46                       | 3.74      | 2.52      | 3.155     | -      | -      | -      | 3.79      | 3.52      | 3.95      | 2.33      | 3.25      |
| cromo         | mg/L     | 0.05                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre         | mg/L     | 1                                                    | P                    | 0.0004                     | < 0.001   | 0.0018    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.0003    | 0.001     | 0.0003    |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.05                       | < 0.05    | 0.26      | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | 0.04      | 0.11      | 0.03      |
| plomo         | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | 0.0004    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | 0.0003                     | < 0.001   | 0.0003    | < 0.001   | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | 0.0003    | 0.0002    |
| magnesio      | mg/L     |                                                      |                      | 2.01                       | 1.78      | 1.18      | 1.405     | -      | -      | -      | 1.81      | 1.67      | 2.1       | 1.18      | 1.47      |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.0074                     | 0.009     | 0.022     | 0.01      | -      | -      | -      | 0.018     | 0.004     | 0.0032    | 0.019     | 0.01      |
| mercurio      | mg/L     | 0.001                                                | P                    | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.67                       | 0.7       | 0.65      | 0.65      | -      | -      | -      | 0.6       | 0.6       | 0.68      | 0.56      | 0.54      |
| selenio       | mg/L     | 0.01                                                 | P                    | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 8.63                       | 8.2       | 5.03      | 6.3       | -      | -      | -      | 7.6       | 7.2       | 9.49      | 6.44      | 6.61      |
| plata         | mg/L     | 0.05                                                 | P                    | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | 4.04                       | 3.6       | 2.49      | 3.055     | -      | -      | -      | 3.74      | 3.8       | 4.16      | 2.57      | 3.02      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | 0.029                      | 0.029     | 0.019     | 0.025     | -      | -      | -      | 0.029     | 0.029     | 0.034     | 0.019     | 0.028     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0008                     | < 0.001   | 0.0079    | < 0.001   | -      | -      | -      | < 0.001   | 0.001     | 0.0005    | 0.0038    | 0.0004    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0008                     | < 0.001   | 0.0016    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.001     | 0.0009    | 0.0006    |
| zinc          | mg/L     | 5                                                    | P                    | < 0.001                    | < 0.005   | 0.003     | < 0.005   | -      | -      | -      | < 0.005   | < 0.005   | 0.001     | 0.002     | < 0.001   |
| zirconio      | mg/L     |                                                      |                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | -      | -      | -      | < 0.04    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

**Tabla 13**
**Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W8 |         |         |          |         |        |         |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|----------|---------|--------|---------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07   | Ene-08  | Mar-08 | May-08  | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |          |         |        |         |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | -                         | 27.1    | 24.2    | 24.4     | 22.5    | 24.4   | 25.7    | 26.5    | 30.3    | 27.6    | 25.3 C  | 24.9    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                       | -       | 7.12    | 7.34     | 7.3     | 7.21   | 6.79    | -       | 7.47    | 7.8     | 7.06    | 7.31    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                         | 60      | 40      | 60       | 70      | 62     | 58      | 60      | -       | 80      | 30      | 200     |
| redox                                                         | mV                                      |                                                      |                      | -                         | 173     | 164     | 850-1150 | -       | 73     | -       | 104     | -       | 290     | 211     | 20      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 59.5    | 37.3     | -       | 23.2   | 2.79    | 4.28    | -       | 3.83    | 648     | 408     |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |          |         |        |         |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | -                         | 7.32    | 6.95    | 6.63     | 7.27    | 7.58   | 7.24    | 7.35    | 7.58    | 7.63    | 6.71    | 7.17    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | -                         | 50      | 43      | 54       | 62      | 72     | 58      | 61      | 62      | 71      | 27      | 48      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                         | 16      | 12.8    | 17       | 20      | 28.5   | 18.4    | 18      | 20.6    | 22.4    | 13      | 12.2    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | -                         | 16      | 12.9    | 16       | 19      | 30     | 17.6    | 20      | 24      | 25.4    | 6.4     | 29.5    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | -                         | 49      | 42      | 25       | 31      | 59     | 70      | 51      | 72      | 57      | 61      | 96      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | -                         | 1       | 57      | 20       | 4       | 31     | 2       | < 1     | 75      | 2       | 1470    | 1610    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | -                         | 16.1    | 14.2    | 19.2     | 20.3    | 27.55  | 18.8    | 19.1    | 23.8    | 30.1    | 7       | 15.1    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | -                         | 19.7    | 17.3    | 23.5     | 24.8    | 33.6   | 23      | 23.3    | 29.1    | 36.7    | 8.6     | 18.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | -                         | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | -                         | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |          |         |        |         |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | -                         | < 0.01  | < 0.01  | < 0.01   | < 0.01  | < 0.01 | 0.02    | < 0.01  | < 0.01  | < 0.01  | < 0.03  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | -                         | 0.08    | 0.13    | 0.09     | 0.07    | 0.06   | 0.1     | 0.06    | < 0.05  | 0.04    | 0.12    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | -                         | 0.05    | 0.13    | 0.09     | 0.07    | 0.06   | 0.1     | 0.06    | < 0.05  | -       | -       | 0.08    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | -                         | < 0.002 | < 0.002 | < 0.002  | < 0.002 | 0.003  | < 0.002 | <0.002  | 0.002   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | -                         | 0.2     | < 0.2   | < 0.2    | < 0.2   | 0.45   | < 0.2   | < 0.2   | < 0.2   | < 0.2   | 0.8     | 0.5     |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |          |         |        |         |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | -                         | 2.79    | 3.23    | 3.66     | 3.97    | 4.245  | 4.22    | 3.72    | 3.97    | 3.88    | 2.53    | 4.73    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | -                         | < 0.05  | < 0.05  | < 0.05   | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | -                         | 4.34    | 2.86    | 3.09     | 3.06    | 3.62   | 3.79    | 3.92    | 3.68    | 3.59    | 2.84    | 4.11    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |         |          |         |        |         |         |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | -                         | 0.2     | < 0.2   | < 0.2    | < 0.2   | 0.45   | < 0.2   | < 0.2   | < 0.2   | < 0.2   | 0.8     | 0.5     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | -                         | < 20    | < 20    | < 20     | < 20    | < 20   | < 20    | 28      | < 20    | 41      | 44      | 93      |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | -                         | 2.3     | 1.4     | 1.6      | 2.1     | 1.35   | 1       | < 1     | 1.3     | 1.2     | 1.6     | 1.3     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | -                         | < 2     | < 2     | < 2      | < 2     | 2.5    | < 2     | 2       | < 2     | 12      | 9       | 4       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | -                         | < 2     | < 2     | < 2      | < 2     | < 2    | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | -                         | 0.032   | < 0.001 | < 0.001  | < 0.001 | 0.023  | 0.004   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -        | -       | -      | -       | 9600    | 5500    | 12000   | 17800   | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -        | -       | -      | -       | 5300    | 1800    | 8000    | 1200    | -       |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W8 |           |           |           |           |           |           |           |           |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | -                         | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | -                         | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales disueltos                    |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | -                         | 0.055     | 0.07      | 0.11      | 0.028     | 0.065     | 0.03      | 0.02      | 0.17      | 0.019     | 2.17      | 0.049     |
| antimonio                            | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0007    |
| arsénico                             | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | -                         | 0.012     | 0.0073    | 0.01      | 0.011     | 0.012     | 0.011     | 0.01      | 0.0092    | 0.012     | 0.075     | 0.0052    |
| berilio                              | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | -                         | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | -                         | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L     |                                                      |                      | -                         | 3.95      | 2.89      | 3.93      | 4.37      | 5.71      | 4.4       | 4.07      | 4.67      | 5.3       | 3.15      | 3.24      |
| cromo                                | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | 0.0005    | 0.0002    |
| cobalto                              | mg/L     |                                                      |                      | -                         | 0.002     | 0.0006    | 0.002     | < 0.001   | < 0.001   | 0.0023    | < 0.001   | 0.0023    | 0.0019    | 0.0042    | 0.0044    |
| cobre                                | mg/L     |                                                      |                      | -                         | < 0.001   | 0.0008    | < 0.001   | < 0.001   | 0.001     | 0.0007    | < 0.001   | 0.001     | 0.0004    | 0.0088    | 0.002     |
| hierro                               | mg/L     |                                                      |                      | -                         | 0.14      | 0.11      | 0.24      | 0.13      | 0.075     | 0.12      | 0.12      | 0.19      | 0.11      | 1.13      | 0.08      |
| plomo                                | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | 0.0019    | 0.0004    |
| litio                                | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | 0.0005    | < 0.0002  |
| magnesio                             | mg/L     |                                                      |                      | -                         | 1.47      | 1.35      | 1.66      | 2.1       | 3.455     | 1.79      | 1.81      | 2.16      | 2.22      | 1.25      | 0.98      |
| manganeso                            | mg/L     |                                                      |                      | -                         | 0.016     | 0.103     | 0.13      | 0.16      | 0.18      | 0.143     | 0.064     | 0.114     | 0.057     | 0.364     | 0.143     |
| mercurio                             | mg/L     |                                                      |                      | -                         | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | ug/L     |                                                      |                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | 0.0003    |
| níquel                               | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0003    | < 0.001   | 0.0004    | 0.0003    | 0.0004    | 0.0007    |
| fósforo                              | mg/L     |                                                      |                      | -                         | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | -                         | 0.6       | 0.55      | 0.7       | 0.6       | 0.85      | 0.79      | 0.6       | 0.62      | 0.64      | 0.57      | 0.6       |
| selenio                              | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | -                         | 6.8       | 5.41      | 5.8       | 6.6       | 9.1       | 6.39      | 6         | 7.37      | 7.5       | 5.64      | 4.66      |
| plata                                | mg/L     |                                                      |                      | -                         | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | -                         | 3.24      | 3.07      | 3.51      | 3.6       | 6.28      | 3.93      | 3.45      | 4.04      | 3.69      | 2.24      | 3.56      |
| estroncio                            | mg/L     |                                                      |                      | -                         | 0.03      | 0.017     | 0.023     | 0.028     | 0.042     | 0.028     | 0.024     | 0.027     | 0.035     | 0.025     | 0.019     |
| telurio                              | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | -                         | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                                | mg/L     |                                                      |                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | -                         | 0.001     | 0.0016    | 0.002     | < 0.001   | < 0.001   | 0.0014    | < 0.001   | 0.0041    | 0.001     | 0.0013    | 0.0015    |
| uranio                               | mg/L     |                                                      |                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | -                         | < 0.001   | 0.0005    | < 0.001   | < 0.001   | < 0.001   | 0.0007    | < 0.001   | 0.001     | 0.0006    | 0.0044    | 0.0004    |
| zinc                                 | mg/L     |                                                      |                      | -                         | < 0.005   | < 0.001   | < 0.005   | < 0.005   | < 0.005   | 0.002     | < 0.005   | 0.001     | < 0.001   | 0.007     | 0.002     |
| zirconio                             | mg/L     |                                                      |                      | -                         | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |



Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de monitoreo W8 |           |           |           |           |           |           |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | -                         | 0.1       | 1.51      | 0.37      | 0.16      | 2.4       | 0.11      | 0.89      | 2.95      | 0.049     | 0.15      | 17.9      |
| antimonio     | mg/L     | 0.005                                                | P                    | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| bario         | mg/L     | 0.7                                                  | P                    | -                         | 0.013     | 0.018     | 0.013     | 0.012     | 0.0215    | 0.011     | 0.012     | 0.037     | 0.013     | 0.0038    | 0.152     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| bismuto       | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | -                         | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | 0.1       | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | -                         | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | 0.00011   |
| calcio        | mg/L     |                                                      |                      | -                         | 4.01      | 2.81      | 3.63      | 4.25      | 5.81      | 4.03      | 4.65      | 5.24      | 5.65      | 1.5       | 5.55      |
| cromo         | mg/L     | 0.05                                                 | P                    | -                         | < 0.001   | 0.0007    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | 0.0029    |
| cobalto       | mg/L     |                                                      |                      | -                         | < 0.001   | 0.0008    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.003     | < 0.0002  | 0.0024    | 0.018     |
| cobre         | mg/L     | 1                                                    | P                    | -                         | 0.001     | 0.0028    | 0.002     | < 0.001   | 0.0035    | 0.001     | 0.001     | 0.01      | 0.0006    | 0.0008    | 0.04      |
| hierro        | mg/L     | 0.3                                                  | P                    | -                         | 0.24      | 1.26      | 0.49      | 0.32      | 1.315     | 0.18      | 0.29      | 3.3       | 0.2       | 0.18      | 12.7      |
| plomo         | mg/L     | 0.01                                                 | P                    | -                         | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.004     | < 0.0002  | < 0.0002  | 0.0038    |
| litio         | mg/L     | 0.0146                                               | ORNL                 | -                         | < 0.001   | 0.0005    | < 0.001   | < 0.001   | 0.001     | < 0.0002  | 0.001     | 0.002     | < 0.0002  | < 0.0002  | 0.0071    |
| magnesio      | mg/L     |                                                      |                      | -                         | 1.51      | 1.44      | 1.6       | 2.07      | 3.76      | 1.82      | 2.12      | 2.74      | 2.75      | 0.63      | 3.8       |
| manganeso     | mg/L     | 0.1                                                  | P                    | -                         | 0.01      | 0.119     | 0.13      | 0.15      | 0.185     | 0.108     | 0.08      | 0.22      | 0.025     | 0.084     | 1.09      |
| mercurio      | mg/L     | 0.001                                                | P                    | -                         | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0002    |
| níquel        | mg/L     | 0.02                                                 | P                    | -                         | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.0026    |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | -                         | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | 0.15      |
| potasio       | mg/L     |                                                      |                      | -                         | 0.7       | 0.84      | 0.7       | 0.6       | 1.1       | 0.78      | 0.7       | 1.1       | 0.66      | 0.52      | 1.6       |
| selenio       | mg/L     | 0.01                                                 | P                    | -                         | 0.001     | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | 0.0005    |
| silicio       | mg/L     |                                                      |                      | -                         | 6.9       | 6.64      | 5.7       | 6.7       | 12.05     | 6.3       | 6.6       | 9.2       | 8.48      | 4.97      | 14.7      |
| plata         | mg/L     | 0.05                                                 | P                    | -                         | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | 0.00006   | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | 0.00008   |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | -                         | 3.24      | 3         | 3.4       | 3.51      | 6.49      | 3.82      | 3.97      | 4.75      | 4.35      | 2.43      | 3.31      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | -                         | 0.031     | 0.018     | 0.022     | 0.028     | 0.0435    | 0.025     | 0.027     | 0.032     | 0.036     | 0.0098    | 0.049     |
| telurio       | mg/L     |                                                      |                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | -                         | < 0.0001  | 0.00002   | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | 0.00007   |
| torio         | mg/L     |                                                      |                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0008    |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | -                         | 0.002     | 0.017     | 0.002     | 0.006     | 0.0375    | 0.0025    | 0.001     | 0.028     | 0.0021    | 0.0039    | 0.018     |
| uranio        | mg/L     | 0.02                                                 | CCME                 | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0002    |
| vanadio       | mg/L     |                                                      |                      | -                         | < 0.001   | 0.0032    | < 0.001   | < 0.001   | < 0.001   | 0.0006    | < 0.001   | 0.008     | 0.0006    | 0.0007    | 0.024     |
| zinc          | mg/L     | 5                                                    | P                    | -                         | < 0.005   | 0.002     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | 0.023     | 0.002     | 0.002     | 0.046     |
| zirconio      | mg/L     |                                                      |                      | -                         | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.03    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |



Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W4 |         |         |         |         |         |         |         |         |          |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08  | Sept-08 | Oct-08   | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 25.9                      | 27      | 24.5    | 24.2    | 23.5    | 25.4    | 25.8    | 26.4    | 28.2    | 27.4     | 25.1 C  | 25.2    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                       | 5.9     | 7.1     | 7.34    | 7.3     | 8.01    | 6.8     | -       | 7.33    | 8        | 7.22    | 7       |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 70      | 40      | 50      | 70      | 95      | 59      | 59      | -       | 80       | 40      | 215     |
| redox                                                         | mV                                      |                                                      |                      | 214                       | 170     | 250     | 177     | -       | 67      | -       | 94      | -       | 290      | 227     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 54      | 9.31    | -       | 3.89    | 2.87    | 6.8     | -       | 2.34     | 4.09    | 60.7    |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.22                      | 7.58    | 6.95    | 6.54    | 7.06    | 7.68    | 7.34    | 7.44954 | 7.53    | 7.664741 | 7.32    | 7.35    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 66      | 40      | 48      | 61      | 66      | 59      | 59      | 53      | 66       | 42      | 47      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.6                      | 23      | 12.3    | 14      | 17      | 24      | 19      | 17.5    | 16.3    | 19.9     | 10.5    | 13      |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 15.5                      | 22      | 12      | 14      | 17      | 25      | 17.8    | 19      | 17      | 22.55    | 12.2    | 15      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 44                        | 45      | 32      | 35      | 45      | 56      | 72      | 50.5    | 54      | 43       | 32      | 24      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 4                         | 2       | 34      | 6       | 2       | 4       | 2       | 4       | 8       | 2.5      | 6       | 121     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 22.2                      | 27      | 15.9    | 19.5    | 41.3    | 27.4    | 22.3    | 21.3    | 21.2    | 32.15    | 16.4    | 20.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 27                        | 32.9    | 19.3    | 23.8    | 50.4    | 33.4    | 27.3    | 25.95   | 25.8    | 39.25    | 20      | 24.8    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | 0.02    | 0.01    | 0.02    | 0.02     | < 0.01  | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.08                      | < 0.05  | 0.16    | 0.12    | 0.06    | < 0.05  | 0.05    | 0.075   | 0.13    | 0.06     | 0.12    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.08                      | < 0.05  | 0.16    | 0.12    | 0.06    | < 0.05  | 0.05    | 0.075   | 0.13    | -        | -       | 0.09    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002  | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | 0.2                       | < 0.2   | 0.2     | < 0.2   | < 0.2   | 0.3     | < 0.2   | 0.5     | < 0.2   | 0.2      | < 0.2   | 0.4     |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 3.04                      | 3.43    | 2.73    | 3.16    | 3.56    | 4.07    | 3.72    | 3.475   | 3.36    | 3.32     | 3.14    | 4.12    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05   | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 1.81                      | 1.36    | 1.29    | 1.3     | 1.41    | 1.63    | 1.82    | 1.84    | 2.36    | 1.615    | 1.22    | 1.56    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | 0.2                       | < 0.2   | 0.2     | < 0.2   | < 0.2   | 0.3     | < 0.2   | 0.5     | < 0.2   | 0.2      | < 0.2   | 0.4     |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | 37                        | < 20    | < 20    | < 20    | 21      | < 20    | 20      | 31      | < 20    | 121.5    | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | < 1                       | 1.3     | 2.1     | 1.3     | < 1     | < 1     | 1.2     | 3.25    | 1.9     | 1.25     | 1.7     | 1.1     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | 3                         | < 2     | < 2     | < 2     | < 2     | 2       | < 2     | 4       | < 2     | 9.5      | < 2     | 3       |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2      | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | < 0.001                   | 0.007   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001  | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 5,200   | 10,500  | 8,650    | 10,300  | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 2,650   | 3,400   | 3,900    | 700     | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.002  | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.002  | < 0.002 | < 0.002 |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W4 |           |           |           |           |           |           |           |           |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio          | mg/L     |                                                      |                      | 0.074                     | 0.025     | 0.11      | 0.046     | 0.016     | 0.047     | 0.025     | 0.039     | 0.059     | 0.0125    | 0.077     | 0.069     |
| antimonio         | mg/L     |                                                      |                      | 0.0002                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0003    |
| arsénico          | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.0004    | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | 0.015                     | 0.015     | 0.01      | 0.014     | 0.015     | 0.015     | 0.015     | 0.013     | 0.011     | 0.016     | 0.011     | 0.009     |
| berilio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 | 0.00005   |
| calcio            | mg/L     |                                                      |                      | 4.06                      | 5.57      | 2.99      | 3.37      | 4.1       | 4.93      | 4.78      | 4.24      | 3.81      | 4.97      | 2.44      | 3.22      |
| cromo             | mg/L     |                                                      |                      | 0.0003                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0007    |
| cobalto           | mg/L     |                                                      |                      | 0.0029                    | 0.003     | 0.0026    | < 0.001   | 0.006     | 0.001     | < 0.0002  | < 0.001   | 0.0006    | < 0.0002  | 0.0008    | 0.0064    |
| cobre             | mg/L     |                                                      |                      | 0.0005                    | < 0.001   | 0.001     | < 0.001   | < 0.001   | 0.001     | 0.0006    | < 0.001   | 0.0009    | 0.00045   | 0.0008    | 0.002     |
| hierro            | mg/L     |                                                      |                      | 0.16                      | 0.21      | 0.16      | 0.15      | 0.11      | 0.13      | 0.17      | 0.15      | 0.13      | 0.145     | 0.09      | 0.14      |
| plomo             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0036    |
| litio             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | 0.001     | 0.0002    | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio          | mg/L     |                                                      |                      | 1.57                      | 2.16      | 1.18      | 1.29      | 1.65      | 2.86      | 1.73      | 1.655     | 1.66      | 1.81      | 1.06      | 1.21      |
| manganeso         | mg/L     |                                                      |                      | 0.042                     | 0.058     | 0.036     | 0.035     | 0.046     | 0.038     | 0.0044    | 0.025     | 0.057     | 0.0096    | 0.066     | 0.059     |
| mercurio          | mg/L     |                                                      |                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | ug/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | 0.0004                    | < 0.001   | 0.0004    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0009    |
| fósforo           | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | 0.75                      | 0.7       | 0.61      | 0.6       | 0.6       | 0.7       | 0.74      | 0.65      | 0.64      | 0.685     | 0.57      | 0.57      |
| selenio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | 9.08                      | 10.9      | 6.8       | 6.8       | 8.5       | 12.7      | 8.61      | 7.65      | 6.54      | 10.25     | 8.37      | 6.55      |
| plata             | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | 0.00005   |
| sodio             | mg/L     |                                                      |                      | 4.22                      | 4.91      | 3.19      | 3.45      | 3.84      | 6.97      | 4.21      | 3.89      | 3.54      | 4.085     | 3.08      | 3.46      |
| estroncio         | mg/L     |                                                      |                      | 0.033                     | 0.044     | 0.024     | 0.028     | 0.035     | 0.051     | 0.042     | 0.034     | 0.027     | 0.0455    | 0.022     | 0.027     |
| telurio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | 0.00006   |
| toro              | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | 0.0034                    | < 0.001   | 0.0058    | 0.002     | < 0.001   | < 0.001   | 0.002     | 0.001     | 0.0034    | 0.0015    | 0.0029    | 0.0027    |
| uranio            | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | 0.001                     | < 0.001   | 0.001     | < 0.001   | < 0.001   | < 0.001   | 0.0011    | < 0.001   | 0.0008    | 0.001     | 0.0008    | 0.0008    |
| zinc              | mg/L     |                                                      |                      | 0.002                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | < 0.001   | < 0.001   | < 0.001   | 0.003     |
| zirconio          | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Total Metales     |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio          | mg/L     | 0.2                                                  | P                    | 0.17                      | 0.054     | 0.66      | 0.14      | 0.05      | 0.26      | 0.06      | 1.25      | 0.16      | 0.0445    | 0.11      | 1.4       |
| antimonio         | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     | 0.7                                                  | P                    | 0.013                     | 0.015     | 0.017     | 0.014     | 0.014     | 0.016     | 0.015     | 0.0155    | 0.014     | 0.018     | 0.013     | 0.033     |
| berilio           | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W4 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | CCME                 | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio    | mg/L     |                                                      |                      | 3.46                      | 5.56      | 2.83      | 3.38      | 4.06      | 5.11      | 4.29      | 4.625     | 3.83      | 5.36      | 2.87      | 3.49      |
| cromo     | mg/L     | 0.05                                                 | P                    | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| cobalto   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | 0.0004    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0018    |
| cobre     | mg/L     | 1                                                    | P                    | 0.0007                    | < 0.001   | 0.0026    | < 0.001   | < 0.001   | 0.001     | 0.0007    | 0.001     | 0.001     | 0.0005    | 0.0005    | 0.0061    |
| hierro    | mg/L     | 0.3                                                  | P                    | 0.25                      | 0.31      | 0.65      | 0.3       | 0.18      | 0.31      | 0.23      | 0.345     | 0.29      | 0.255     | 0.19      | 1.41      |
| plomo     | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0002                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | 0.0007    |
| magnesio  | mg/L     |                                                      |                      | 1.67                      | 2.07      | 1.19      | 1.3       | 1.68      | 2.92      | 1.73      | 1.79      | 1.69      | 2.22      | 1.23      | 1.52      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.022                     | 0.032     | 0.039     | 0.033     | 0.013     | 0.031     | 0.025     | 0.0315    | 0.034     | 0.0105    | 0.022     | 0.136     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.63                      | 0.7       | 0.64      | 0.6       | 0.6       | 0.9       | 0.74      | 0.7       | 0.7       | 0.705     | 0.55      | 0.71      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 8.88                      | 10.3      | 6.9       | 7         | 8.8       | 13        | 8.44      | 8.15      | 6.5       | 11.35     | 9.39      | 7.59      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 4.38                      | 4.66      | 3.03      | 3.45      | 3.88      | 7.29      | 4.27      | 4.15      | 3.87      | 4.85      | 3.46      | 3.37      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.03                      | 0.043     | 0.024     | 0.027     | 0.036     | 0.051     | 0.036     | 0.0365    | 0.027     | 0.0475    | 0.023     | 0.032     |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.0041                    | < 0.001   | 0.01      | 0.002     | 0.002     | 0.003     | 0.0023    | 0.004     | 0.002     | 0.00175   | 0.0041    | 0.01      |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.001                     | < 0.001   | 0.0022    | < 0.001   | < 0.001   | < 0.001   | 0.0008    | < 0.001   | 0.001     | 0.00105   | 0.0009    | 0.0039    |
| zinc      | mg/L     | 5                                                    | P                    | < 0.001                   | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | < 0.001   | 0.014     | < 0.005   | 0.0015    | 0.001     | 0.005     |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.13    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

**Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W6 |         |         |         |         |         |         |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 26                        | 27      | 35.4    | 25.2    | 24      | 23.3    | 27.5    | 26.1    | 28      | 27      | 24.5°C  | 25.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                       | -       | 7.14    | 7.3     | 7.3     | 6.52    | 6.7     | -       | 7.23    | 7.8     | 6.76    | 6.9     |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 90      | 70      | -       | 110     | 46      | 125     | 64      | -       | 80      | 70      | 161     |
| redox                                                         | mV                                      |                                                      |                      | 229                       | 165     | 203     | -       | -       | 68      | -       | 90      | -       | 280     | 161     | 90      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 16.6    | 12.8    | -       | 1.58    | 1.97    | 2.14    | -       | 1.54    | 5.08    | 9.4     |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.19                      | 7.3     | 6.9     | 6.53    | 6.96    | 7.48    | 7.47    | 7.24    | 7.35    | 7.4     | 7.18    | 7.33    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 50      | 39      | 45      | 71      | 67      | 78      | 55      | 44      | 57      | 63      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.4                      | 16      | 13.5    | 13      | 26      | 30      | 23.2    | 16      | 20.7    | 16      | 27.4    | 21.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 15.6                      | 18      | 11.1    | 13      | 22      | 26      | 22.2    | 16      | 28      | 18      | 19.7    | 14      |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 61                        | 41      | 33      | 27      | 62      | 56      | 73      | 39      | 49      | 46      | 32      | 49      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 14                        | < 1     | 10      | 10      | 2       | 1       | 4       | 2       | 13      | 3       | 5       | 13      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 17.5                      | 15.7    | 13.2    | 14.9    | 27.5    | 23.7    | 27.1    | 14      | 15.3    | 20.4    | 27.7    | 17.4    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 21.3                      | 19.2    | 16.1    | 18.2    | 33.6    | 28.9    | 33      | 17.1    | 18.6    | 24.9    | 33.8    | 21.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | 0.04    | 0.01    | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.06                      | < 0.05  | 0.12    | 0.07    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | 0.23    | 0.06    | 0.11    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.06                      | < 0.05  | 0.12    | 0.07    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | 0.23    | -       | -       | 0.07    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | < 0.2                     | 0.3     | < 0.2   | < 0.2   | < 0.2   | < 0.2   | < 0.2   | 0.6     | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.83                      | 2.88    | 2.53    | 3.29    | 3.87    | 4.29    | 4.01    | 3.56    | 2.71    | 3.13    | 3       | 4.21    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | 0.18    | < 0.05  | < 0.05  | 0.06    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 4.19                      | 4.74    | 2.94    | 2.96    | 4.01    | 4.64    | 4.41    | 5.72    | 3.14    | 6.2     | 1.14    | 3.94    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | < 0.2                     | 0.3     | < 0.2   | < 0.2   | < 0.2   | < 0.2   | < 0.2   | 0.6     | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | < 20                      | < 20    | < 20    | < 20    | < 20    | < 20    | < 20    | 37      | < 20    | 47      | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | 2.6                       | 1.8     | 3       | 1.9     | 1.1     | 1.3     | 1.2     | 4       | 2.5     | 4       | < 1     | 1.5     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | < 2     | 3       | < 2     | 5       | < 2     | 4       | 2       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | 0.004                     | 0.01    | < 0.001 | < 0.001 | < 0.001 | < 0.001 | 0.005   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 3000    | 28000   | 8000    | 8200    | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 1800    | 8000    | 2200    | 3000    | -       |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W6 |           |           |           |           |           |           |           |           |           |           |           |
|--------------------------------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                                      |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Especies de Cianuro                  |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| cianuro total                        | mg/L     | 0.001                                                | P                    | < 0.01                    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L     |                                                      |                      | < 0.01                    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio                             | mg/L     |                                                      |                      | 0.098                     | 0.058     | 0.13      | 0.071     | 0.018     | 0.026     | 0.03      | 0.042     | 0.06      | 0.015     | 0.053     | 0.028     |
| antimonio                            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0006    |
| arsénico                             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.0004    | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L     |                                                      |                      | 0.014                     | 0.013     | 0.011     | 0.014     | 0.015     | 0.019     | 0.016     | 0.014     | 0.013     | 0.015     | 0.016     | 0.015     |
| berilio                              | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L     |                                                      |                      | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | 0.06      | < 0.01    | < 0.05    | 0.01      | < 0.01    | 0.03      | < 0.01    |
| cadmio                               | mg/L     |                                                      |                      | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.00004 | < 0.00004 | 0.00013   | < 0.00004 |
| calcio                               | mg/L     |                                                      |                      | 4.22                      | 4.23      | 3.26      | 3.32      | 6.23      | 6.31      | 5.94      | 4.02      | 5.18      | 4.16      | 6.83      | 5.18      |
| cromo                                | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L     |                                                      |                      | 0.0006                    | 0.004     | 0.0009    | < 0.001   | 0.005     | < 0.001   | 0.0013    | < 0.001   | 0.0004    | 0.0002    | 0.0011    | 0.0048    |
| cobre                                | mg/L     |                                                      |                      | 0.0007                    | < 0.001   | 0.0008    | < 0.001   | < 0.001   | 0.001     | 0.0007    | 0.001     | 0.0012    | 0.0006    | 0.0011    | 0.0016    |
| hierro                               | mg/L     |                                                      |                      | 0.15                      | 0.14      | 0.15      | 0.15      | 0.14      | 0.15      | 0.14      | 0.12      | 0.13      | 0.07      | 0.18      | 0.23      |
| plomo                                | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio                             | mg/L     |                                                      |                      | 1.43                      | 1.42      | 1.3       | 1.14      | 2.48      | 3.39      | 2.02      | 1.4       | 1.88      | 1.36      | 2.51      | 2.06      |
| manganeso                            | mg/L     |                                                      |                      | 0.021                     | 0.022     | 0.027     | 0.018     | 0.053     | 0.032     | 0.03      | 0.015     | 0.01      | 0.011     | 0.09      | 0.09      |
| mercurio                             | mg/L     |                                                      |                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno                            | ug/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                               | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | 0.0002    | < 0.001   | 0.0003    | < 0.0002  | 0.0003    | 0.0007    |
| fósforo                              | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio                              | mg/L     |                                                      |                      | 0.73                      | 0.6       | 0.55      | 0.7       | 0.6       | 0.8       | 0.79      | 0.7       | 0.77      | 0.7       | 0.71      | 0.78      |
| selenio                              | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.003     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio                              | mg/L     |                                                      |                      | 7.09                      | 6.8       | 5.58      | 5.3       | 8.4       | 10.7      | 7.86      | 5.9       | 6.34      | 7.26      | 9.77      | 6.74      |
| plata                                | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                                | mg/L     |                                                      |                      | 3.54                      | 3.29      | 2.71      | 3.02      | 4         | 6.86      | 4.18      | 3.41      | 3.52      | 3.15      | 4.62      | 3.79      |
| estroncio                            | mg/L     |                                                      |                      | 0.031                     | 0.03      | 0.026     | 0.026     | 0.047     | 0.058     | 0.049     | 0.031     | 0.037     | 0.035     | 0.042     | 0.04      |
| telurio                              | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                                | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                                | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                               | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                              | mg/L     |                                                      |                      | 0.0043                    | 0.001     | 0.0051    | 0.002     | < 0.001   | < 0.001   | 0.0014    | < 0.001   | 0.0032    | 0.0009    | 0.0032    | 0.0018    |
| uranio                               | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                              | mg/L     |                                                      |                      | 0.0013                    | < 0.001   | 0.0008    | < 0.001   | < 0.001   | < 0.001   | 0.0011    | < 0.001   | 0.0009    | 0.0007    | 0.001     | 0.0007    |
| zinc                                 | mg/L     |                                                      |                      | 0.001                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.002     | < 0.005   | 0.008     | < 0.001   | 0.003     | 0.002     |
| zirconio                             | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro     | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W6 |           |           |           |           |           |           |           |           |           |           |           |
|---------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|               |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Total Metales |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio      | mg/L     | 0.2                                                  | P                    | 0.49                      | 0.11      | 0.41      | 0.18      | 0.052     | 0.11      | 0.098     | 1         | 0.11      | 0.044     | 0.25      | 0.19      |
| antimonio     | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico      | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario         | mg/L     | 0.7                                                  | P                    | 0.016                     | 0.013     | 0.014     | 0.014     | 0.014     | 0.019     | 0.016     | 0.016     | 0.013     | 0.016     | 0.014     | 0.017     |
| berilio       | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro          | mg/L     | 5                                                    | CCME                 | 0.01                      | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio        | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | 0.0002    | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | 0.00011   | < 0.00004 |
| calcio        | mg/L     |                                                      |                      | 3.55                      | 4.27      | 2.68      | 3.33      | 5.3       | 5.69      | 5.47      | 4.17      | 6.74      | 4.51      | 4.44      | 3.45      |
| cromo         | mg/L     | 0.05                                                 | P                    | 0.0003                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto       | mg/L     |                                                      |                      | 0.0004                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | 0.0002    |
| cobre         | mg/L     | 1                                                    | P                    | 0.0023                    | < 0.001   | 0.0016    | < 0.001   | 0.001     | < 0.001   | 0.001     | 0.001     | 0.001     | 0.0007    | 0.0012    | 0.0011    |
| hierro        | mg/L     | 0.3                                                  | P                    | 0.49                      | 0.24      | 0.43      | 0.34      | 0.2       | 0.24      | 0.2       | 0.23      | 0.23      | 0.12      | 0.38      | 0.31      |
| plomo         | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio         | mg/L     | 0.0146                                               | ORNL                 | 0.0003                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio      | mg/L     |                                                      |                      | 1.63                      | 1.67      | 1.07      | 1.13      | 2.2       | 2.89      | 2.07      | 1.44      | 2.82      | 1.64      | 2.08      | 1.32      |
| manganeso     | mg/L     | 0.1                                                  | P                    | 0.02                      | 0.013     | 0.02      | 0.021     | 0.033     | 0.019     | 0.02      | 0.018     | 0.007     | 0.0025    | 0.044     | 0.024     |
| mercurio      | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno     | mg/L     | 0.07                                                 | P                    | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | 0.0006    | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel        | mg/L     | 0.02                                                 | P                    | 0.0002                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo       | mg/L     | 0.000146                                             | ORNL                 | 0.03                      | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio       | mg/L     |                                                      |                      | 0.68                      | 0.7       | 0.56      | 0.7       | 0.6       | 0.8       | 0.74      | 0.7       | 0.8       | 0.71      | 0.61      | 0.65      |
| selenio       | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.003     | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio       | mg/L     |                                                      |                      | 7.58                      | 7.3       | 5.16      | 5.3       | 7.6       | 10.1      | 7.93      | 6.1       | 8.4       | 7.77      | 8.92      | 6.01      |
| plata         | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | 0.0003    | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio         | mg/L     | ≤ 200                                                | CCME                 | 3.7                       | 3.38      | 2.54      | 2.96      | 3.63      | 6.56      | 5.36      | 3.45      | 4.44      | 3.72      | 3.47      | 3.29      |
| estroncio     | mg/L     | 4.4                                                  | ORNL                 | 0.028                     | 0.033     | 0.022     | 0.025     | 0.042     | 0.052     | 0.041     | 0.031     | 0.047     | 0.037     | 0.033     | 0.029     |
| telurio       | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio         | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | 0.0004    | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro          | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño        | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio       | mg/L     |                                                      |                      | 0.0081                    | 0.002     | 0.013     | 0.003     | 0.001     | 0.003     | 0.0018    | 0.002     | 0.002     | 0.0009    | 0.012     | 0.0025    |
| uranio        | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio       | mg/L     |                                                      |                      | 0.0022                    | < 0.001   | 0.0014    | 0.001     | 0.001     | < 0.001   | 0.0009    | < 0.001   | 0.001     | 0.0007    | 0.0014    | 0.001     |
| zinc          | mg/L     | 5                                                    | P                    | 0.001                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | < 0.005   | 0.002     | 0.001     | 0.001     |
| zirconio      | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.18    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W7 |         |         |         |         |         |         |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      |                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 25.9                      | 25.5    | 24.6    | 25.2    | 25      | 25      | 27.1    | 26.2    | 26.9    | 27.4    | 23.9°C  | 24      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | n/a                       | 5.3     | 7.2     | 7.48    | 7.6     | 7.23    | 6.88    | -       | 7.36    | 8.1     | 6.75    | 6.71    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 50                        | 50      | 40      | -       | 60      | 31      | 60      | 55      | -       | 70      | 30      | 245     |
| redox                                                         | mV                                      |                                                      |                      | 188                       | 158     | 220     | -       | -       | 65      | -       | 91      | -       | 292     | 215     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | -                         | -       | 17.7    | 7.08    | -       | 1.14    | 1.82    | 26.3    | -       | 2.15    | 10.06   | 5.44    |
| Parámetros Generales                                          |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 7.26                      | 7.43    | 6.99    | 6.56    | 7.27    | 7.54    | 7.25    | 7.27    | 7.29    | 7.53    | 6.80954 | 7.37    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 49                        | 59      | 39      | 46      | 62      | 64      | 61      | 55      | 44      | 65      | 29.5    | 52      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 14.8                      | 20      | 10.9    | 14      | 16      | 24      | 19.2    | 16      | 13.3    | 18.7    | 8.2     | 14.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 16.7                      | 20      | 11      | 13      | 16      | 24      | 17.3    | 16      | 14      | 20.7    | 8.35    | 14.5    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 56                        | 53      | 35      | 29      | 35      | 52      | 62      | 35      | 41      | 54      | 22      | 44      |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | 71                        | 21      | 15      | 3       | < 1     | < 1     | 3       | 2       | 25      | < 1     | 12      | 9       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 18                        | 19.7    | 13.7    | 15.4    | 19.2    | 22      | 18.1    | 14.8    | 15.2    | 22      | 9.05    | 18.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 21.9                      | 24      | 16.7    | 18.8    | 23.4    | 26.8    | 22.1    | 18      | 18.5    | 26.9    | 11      | 22.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | 0.01    | 0.08    | < 0.01  | 0.03    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | 0.07                      | 0.15    | 0.13    | 0.06    | 0.05    | < 0.05  | < 0.05  | < 0.05  | 0.23    | 0.05    | 0.13    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | 0.07                      | 0.15    | 0.13    | 0.06    | 0.05    | < 0.05  | < 0.05  | < 0.05  | 0.23    | -       | -       | 0.07    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | 0.4                       | 0.3     | < 0.2   | < 0.2   | < 0.2   | 0.2     | < 0.2   | 0.2     | 0.3     | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.72                      | 3.58    | 2.45    | 3.34    | 3.95    | 4.3     | 4.12    | 3.6     | 2.68    | 3.24    | 2.125   | 4.21    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 3.79                      | 3.69    | 2.76    | 2.97    | 4.49    | 4.68    | 5.29    | 5.05    | 2.82    | 7.34    | 2.95    | 3.74    |
| Orgánicos                                                     |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | 0.4                       | 0.3     | < 0.2   | < 0.2   | < 0.2   | 0.2     | < 0.2   | 0.2     | 0.2     | < 0.2   | < 0.2   | < 0.2   |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | 40                        | < 20    | < 20    | < 20    | 78      | < 20    | < 20    | 26      | < 20    | 148     | < 20    | < 10    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | 2.7                       | 2.3     | 2.2     | 2       | 1.2     | 1.6     | 1.3     | 4.4     | 3.3     | 2.1     | 2.25    | 1.2     |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | 3       | 3       | < 2     | 3       | < 2     | 5       | 3       | < 2     |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | < 2                       | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     | < 2     |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | 0.047                     | 0.021   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | 0.001   | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 3100    | 14000   | 9000    | 8600    | -       |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | -                         | -       | -       | -       | -       | -       | -       | 1600    | 10000   | 2900    | 2650    | -       |
| Especies de Cianuro                                           |                                         |                                                      |                      |                           |         |         |         |         |         |         |         |         |         |         |         |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.002 | < 0.002 | < 0.002 |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.002 | < 0.002 | < 0.002 |



Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W7 |           |           |           |           |           |           |           |           |           |           |           |
|-------------------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                   |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Metales Disueltos |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio          | mg/L     |                                                      |                      | 0.12                      | 0.1       | 0.16      | 0.048     | 0.028     | 0.13      | 0.04      | 0.045     | 0.14      | 0.02      | 0.145     | 0.038     |
| antimonio         | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     |                                                      |                      | 0.014                     | 0.009     | 0.01      | 0.014     | 0.014     | 0.017     | 0.016     | 0.014     | 0.011     | 0.015     | 0.0099    | 0.014     |
| berilio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro              | mg/L     |                                                      |                      | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio            | mg/L     |                                                      |                      | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.00004 | < 0.00004 | 0.00013   | < 0.00004 |
| calcio            | mg/L     |                                                      |                      | 3.66                      | 4.67      | 2.66      | 3.41      | 3.9       | 5.19      | 4.98      | 4.06      | 3.21      | 4.86      | 1.97      | 3.64      |
| cromo             | mg/L     |                                                      |                      | 0.0002                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto           | mg/L     |                                                      |                      | 0.0007                    | 0.002     | 0.0026    | < 0.001   | 0.002     | 0.001     | < 0.0002  | < 0.001   | 0.0005    | < 0.0002  | 0.00325   | 0.003     |
| cobre             | mg/L     |                                                      |                      | 0.0015                    | < 0.001   | 0.0015    | < 0.001   | < 0.001   | 0.004     | 0.0009    | 0.001     | 0.0015    | 0.0007    | 0.00185   | 0.0017    |
| hierro            | mg/L     |                                                      |                      | 0.19                      | 0.18      | 0.18      | 0.14      | 0.09      | 0.11      | 0.15      | 0.14      | 0.18      | 0.09      | 0.145     | 0.11      |
| plomo             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio             | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio          | mg/L     |                                                      |                      | 1.38                      | 1.96      | 1.04      | 1.21      | 1.59      | 2.61      | 1.64      | 1.44      | 1.29      | 1.6       | 0.79      | 1.34      |
| manganeso         | mg/L     |                                                      |                      | 0.057                     | 0.15      | 0.019     | 0.013     | 0.014     | 0.012     | 0.018     | 0.013     | 0.0061    | 0.009     | 0.028     | 0.022     |
| mercurio          | mg/L     |                                                      |                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno         | ug/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | 0.0005    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.0003    | < 0.0002  | 0.0006    | 0.0005    |
| fósforo           | mg/L     |                                                      |                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio           | mg/L     |                                                      |                      | 0.72                      | 0.8       | 0.55      | 0.7       | 0.6       | 0.8       | 0.83      | 0.7       | 0.75      | 0.71      | 0.53      | 0.66      |
| selenio           | mg/L     |                                                      |                      | < 0.0002                  | 0.001     | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio           | mg/L     |                                                      |                      | 7.21                      | 7.1       | 5.11      | 5.6       | 6.7       | 9.4       | 6.96      | 6.1       | 5.3       | 7.51      | 5.045     | 6.14      |
| plata             | mg/L     |                                                      |                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio             | mg/L     |                                                      |                      | 3.26                      | 3.84      | 2.49      | 3.29      | 3.55      | 6.27      | 3.86      | 3.45      | 2.74      | 3.25      | 2.21      | 3.31      |
| estroncio         | mg/L     |                                                      |                      | 0.028                     | 0.026     | 0.02      | 0.026     | 0.032     | 0.049     | 0.042     | 0.03      | 0.026     | 0.041     | 0.016     | 0.029     |
| telurio           | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio             | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| toro              | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño            | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio           | mg/L     |                                                      |                      | 0.0048                    | 0.003     | 0.0063    | 0.002     | < 0.001   | < 0.001   | 0.0017    | < 0.001   | 0.0073    | 0.001     | 0.00525   | 0.0008    |
| uranio            | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio           | mg/L     |                                                      |                      | 0.0013                    | < 0.001   | 0.0009    | < 0.001   | < 0.001   | < 0.001   | 0.001     | < 0.001   | 0.001     | 0.0008    | 0.00075   | 0.0006    |
| zinc              | mg/L     |                                                      |                      | 0.002                     | < 0.005   | 0.001     | < 0.005   | 0.012     | < 0.005   | 0.002     | < 0.005   | 0.002     | < 0.001   | 0.0015    | 0.002     |
| zirconio          | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Total Metales     |          |                                                      |                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio          | mg/L     | 0.2                                                  | P                    | 1.11                      | 0.33      | 0.49      | 0.098     | 0.072     | 0.09      | 0.099     | 1.1       | 0.53      | 0.073     | 0.295     | 0.13      |
| antimonio         | mg/L     | 0.005                                                | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico          | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario             | mg/L     | 0.7                                                  | P                    | 0.024                     | 0.011     | 0.014     | 0.014     | 0.015     | 0.017     | 0.015     | 0.015     | 0.019     | 0.017     | 0.011     | 0.015     |
| berilio           | mg/L     | 0.0146                                               | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |



Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Ubicación de Monitoreo W7 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      |                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | CCME                 | 0.01                      | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | 0.1       | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | P                    | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | 0.00011   | < 0.00004 |
| calcio    | mg/L     |                                                      |                      | 3.76                      | 4.45      | 2.59      | 3.23      | 3.88      | 5.03      | 4.24      | 4.11      | 3.46      | 5.13      | 1.97      | 3.5       |
| cromo     | mg/L     | 0.05                                                 | P                    | 0.0006                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      |                      | 0.0015                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | P                    | 0.006                     | 0.002     | 0.0026    | < 0.001   | < 0.001   | < 0.001   | 0.0014    | 0.001     | 0.004     | 0.0009    | 0.0021    | 0.0013    |
| hierro    | mg/L     | 0.3                                                  | P                    | 1.27                      | 0.6       | 0.51      | 0.25      | 0.15      | 0.19      | 0.24      | 0.26      | 0.78      | 0.19      | 0.285     | 0.27      |
| plomo     | mg/L     | 0.01                                                 | P                    | 0.0004                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | ORNL                 | 0.0005                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      |                      | 1.78                      | 2.09      | 1.1       | 1.15      | 1.57      | 2.7       | 1.62      | 1.49      | 1.33      | 1.91      | 0.83      | 1.39      |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.075                     | 0.12      | 0.019     | 0.014     | 0.008     | 0.011     | 0.014     | 0.018     | 0.028     | 0.013     | 0.014     | 0.018     |
| mercurio  | mg/L     | 0.001                                                | P                    | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | P                    | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | 0.0002    | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | P                    | 0.0005                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0007    | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | 0.05                      | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      |                      | 0.72                      | 0.8       | 0.57      | 0.7       | 0.6       | 0.8       | 0.76      | 0.7       | 0.8       | 0.7       | 0.54      | 0.65      |
| selenio   | mg/L     | 0.01                                                 | P                    | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | < 0.0002  |
| silicio   | mg/L     |                                                      |                      | 7.68                      | 7.3       | 5.18      | 5.3       | 6.7       | 9.6       | 6.93      | 6.2       | 5.3       | 8.29      | 5.3       | 6.24      |
| plata     | mg/L     | 0.05                                                 | P                    | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 3.72                      | 3.84      | 2.48      | 2.98      | 3.47      | 6.31      | 3.76      | 3.49      | 3.13      | 3.8       | 2.16      | 3.31      |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.028                     | 0.027     | 0.021     | 0.024     | 0.031     | 0.049     | 0.033     | 0.03      | 0.028     | 0.042     | 0.016     | 0.03      |
| telurio   | mg/L     |                                                      |                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      |                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | 0.0002    | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| toro      | mg/L     |                                                      |                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0008    | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      |                      | 0.016                     | 0.003     | 0.016     | 0.002     | 0.002     | 0.003     | 0.003     | 0.001     | 0.006     | 0.0014    | 0.00685   | 0.0024    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      |                      | 0.0044                    | 0.001     | 0.0017    | < 0.001   | < 0.001   | < 0.001   | 0.0009    | < 0.001   | 0.002     | 0.0008    | 0.00115   | 0.0009    |
| zinc      | mg/L     | 5                                                    | P                    | 0.003                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.002     | < 0.005   | 0.009     | 0.001     | 0.0015    | < 0.001   |
| zirconio  | mg/L     |                                                      |                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.19    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Stastics <sup>(b)</sup> |         |        |          |          |       |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------|-------------------------|---------|--------|----------|----------|-------|
|                                                               |                                         |                                                      |                      | Minimum                 | Maximum | Median | Average  | St. Dev. | Count |
| Parámetros de Campo                                           |                                         |                                                      |                      |                         |         |        |          |          |       |
| temperatura                                                   | °C                                      | ≤15                                                  | CCME-AO              | 22.5                    | 35.4    | 25.45  | 25.7654  | 1.83889  | 78    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 5.3                     | 8.27    | 7.23   | 6.8      | -        | 65    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 30                      | 280     | 60     | 76.8356  | 52.4714  | 73    |
| redox                                                         | mV                                      |                                                      |                      | 20                      | 319     | 180    | 173.509  | 72.6467  | 57    |
| turbidez                                                      | NTU                                     | 1                                                    | P                    | 0.5                     | 648     | 4.54   | 31.1176  | 102.362  | 54    |
| Parámetros Generales                                          |                                         |                                                      |                      |                         |         |        |          |          |       |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | P                    | 6.45                    | 7.71    | 7.32   | 7.1052   | -        | 81    |
| conductividad                                                 | µS/cm                                   |                                                      |                      | 25.5                    | 85      | 54     | 55.0185  | 12.3469  | 81    |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 6.55                    | 30      | 16.6   | 17.4846  | 4.89624  | 81    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | P                    | 6.4                     | 30.1    | 17     | 17.634   | 5.2572   | 81    |
| total de sólidos disueltos                                    | µS/cm                                   | 500                                                  | P                    | 15.5                    | 96      | 49     | 47.784   | 14.5684  | 81    |
| total de sólidos en suspensión                                | mg/L                                    |                                                      |                      | <1                      | 1610    | 3      | 48.4321  | 239.865  | 81    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | P                    | 7                       | 41.3    | 19.4   | 19.9086  | 6.04167  | 81    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      |                      | 8.6                     | 50.4    | 23.6   | 24.2809  | 7.37176  | 81    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      |                      | <0.5                    | <0.5    | -      | -        | -        | 81    |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      |                      | <0.5                    | <0.5    | -      | -        | -        | 81    |
| Nutrientes                                                    |                                         |                                                      |                      |                         |         |        |          |          |       |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      |                      | <0.01                   | 0.17    | <0.01  | 0.0113   | 0.0212   | 81    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      |                      | <0.04                   | 0.24    | 0.075  | 0.08753  | 0.05167  | 81    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | P                    | <0.04                   | 0.24    | 0.07   | 0.08531  | 0.05362  | 65    |
| nitrito (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | P                    | <0.002                  | 0.003   | <0.002 | <0.002   | 0.00039  | 81    |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      |                      | <0.2                    | 0.8     | <0.2   | <0.2     | 0.13502  | 81    |
| Aniones                                                       |                                         |                                                      |                      |                         |         |        |          |          |       |
| cloruro                                                       | mg/L                                    | 250                                                  | P                    | 2.02                    | 4.73    | 3.55   | 3.45068  | 0.57693  | 81    |
| fluoruro                                                      | mg/L                                    | 1                                                    | P                    | <0.05                   | 0.18    | <0.05  | <0.05    | 0.01761  | 81    |
| sulfato                                                       | mg/L                                    | 250                                                  | P                    | 1.14                    | 7.34    | 3.5    | 3.54352  | 1.53538  | 81    |
| Orgánicos                                                     |                                         |                                                      |                      |                         |         |        |          |          |       |
| nitrógeno orgánico total                                      | mg/L                                    |                                                      |                      | <0.2                    | 0.8     | <0.2   | <0.2     | 0.13443  | 81    |
| demanda química de oxígeno                                    | mg/L                                    |                                                      |                      | <10                     | 148     | 10     | 20.8827  | 25.1945  | 81    |
| carbono disuelto total                                        | mg/L como C                             |                                                      |                      | <1                      | 4.4     | 1.5    | 1.64568  | 0.91734  | 81    |
| aceite y grasa total                                          | mg/L                                    |                                                      |                      | <2                      | 12      | <2     | 2.30864  | 2.20166  | 81    |
| aceite y grasa en hidrocarburos                               | mg/L                                    |                                                      |                      | <2                      | <2      | -      | -        | -        | 81    |
| fenoles totales                                               | mg/L                                    | 0.001                                                | P                    | <0.001                  | 0.047   | <0.001 | 0.0031   | 0.00816  | 79    |
| coliformes totales                                            | CFU/100mL                               |                                                      |                      | 1,100                   | 28,000  | 5,900  | 7,379.03 | 5,500.18 | 31    |
| coliformes fecales                                            | CFU/100mL                               |                                                      |                      | 200                     | 10,000  | 1,600  | 2,500    | 2,380.58 | 31    |
| Especies de Cianuro                                           |                                         |                                                      |                      |                         |         |        |          |          |       |
| cianuro total                                                 | mg/L                                    | 0.001                                                | P                    | <0.002                  | <0.01   | -      | -        | -        | 81    |
| cianuro disociable en ácidos débiles                          | mg/L                                    |                                                      |                      | <0.002                  | <0.01   | -      | -        | -        | 81    |

Tabla 13 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro         | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Stastics <sup>(b)</sup> |          |          |         |          |       |
|-------------------|----------|------------------------------------------------------|----------------------|-------------------------|----------|----------|---------|----------|-------|
|                   |          |                                                      |                      | Minimum                 | Maximum  | Median   | Average | St. Dev. | Count |
| Metales Disueltos |          |                                                      |                      |                         |          |          |         |          |       |
| aluminio          | mg/L     |                                                      |                      | 0.002                   | 2.17     | 0.045    | 0.08473 | 0.2394   | 81    |
| antimonio         | mg/L     |                                                      |                      | <0.0002                 | 0.0007   | 0.0002   | 0.00029 | 0.0002   | 81    |
| arsénico          | mg/L     |                                                      |                      | <0.0002                 | 0.0005   | <0.0002  | 0.00028 | 0.0002   | 81    |
| bario             | mg/L     |                                                      |                      | 0.0052                  | 0.075    | 0.014    | 0.01399 | 0.0075   | 81    |
| berilio           | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -        | -       | -        | 81    |
| bismuto           | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -        | -       | -        | 81    |
| boro              | mg/L     |                                                      |                      | <0.01                   | 0.06     | <0.01    | 0.01494 | 0.01213  | 81    |
| cadmio            | mg/L     |                                                      |                      | <0.00004                | 0.00018  | <0.00004 | 5.9E-05 | 4.3E-05  | 81    |
| calcio            | mg/L     |                                                      |                      | 1.46                    | 6.83     | 4.06     | 4.11858 | 1.11966  | 81    |
| cromo             | mg/L     |                                                      |                      | <0.0002                 | 0.0007   | 0.0003   | 0.00031 | 0.00019  | 81    |
| cobalto           | mg/L     |                                                      |                      | <0.0002                 | 0.0067   | 0.001    | 0.00177 | 0.00169  | 81    |
| cobre             | mg/L     |                                                      |                      | <0.0003                 | 0.0145   | 0.001    | 0.00286 | 0.00348  | 81    |
| hierro            | mg/L     |                                                      |                      | <0.01                   | 1.13     | 0.14     | 0.14154 | 0.1237   | 81    |
| plomo             | mg/L     |                                                      |                      | <0.0002                 | 0.0036   | <0.0002  | 0.00034 | 0.00045  | 81    |
| litio             | mg/L     |                                                      |                      | <0.0002                 | 0.001    | 0.0002   | 0.00031 | 0.00023  | 81    |
| magnesio          | mg/L     |                                                      |                      | 0.695                   | 3.455    | 1.64     | 1.73204 | 0.55035  | 81    |
| manganeso         | mg/L     |                                                      |                      | 0.0044                  | 0.364    | 0.022    | 0.04138 | 0.05347  | 81    |
| mercurio          | mg/L     |                                                      |                      | <0.00002                | <0.00002 | -        | -       | -        | 81    |
| molibdeno         | ug/L     |                                                      |                      | <0.0001                 | 0.001    | 0.00025  | 0.00027 | 0.00025  | 81    |
| níquel            | mg/L     |                                                      |                      | <0.0002                 | 0.002    | 0.0005   | 0.00041 | 0.00026  | 81    |
| fósforo           | mg/L     |                                                      |                      | <0.03                   | <0.15    | -        | -       | -        | 81    |
| potasio           | mg/L     |                                                      |                      | 0.5                     | 0.87     | 0.67     | 0.66883 | 0.08311  | 81    |
| selenio           | mg/L     |                                                      |                      | <0.0002                 | 0.003    | <0.0002  | 0.00036 | 0.00049  | 81    |
| silicio           | mg/L     |                                                      |                      | 4.065                   | 12.7     | 7.1      | 7.39988 | 1.67723  | 81    |
| plata             | mg/L     |                                                      |                      | <0.00005                | 0.000125 | <0.00005 | 6.7E-05 | 4.9E-05  | 81    |
| sodio             | mg/L     |                                                      |                      | 1.995                   | 6.97     | 3.54     | 3.68099 | 0.89613  | 81    |
| estroncio         | mg/L     |                                                      |                      | 0.0125                  | 0.058    | 0.031    | 0.03144 | 0.00922  | 81    |
| telurio           | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -        | -       | -        | 81    |
| talio             | mg/L     |                                                      |                      | <0.00002                | 0.00006  | <0.00002 | 2.7E-05 | 2E-05    | 81    |
| toro              | mg/L     |                                                      |                      | <0.0001                 | <0.0005  | -        | -       | -        | 81    |
| estaño            | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -        | -       | -        | 81    |
| titanio           | mg/L     |                                                      |                      | <0.0003                 | 0.0073   | 0.001    | 0.0018  | 0.00167  | 81    |
| uranio            | mg/L     |                                                      |                      | <0.0001                 | <0.0005  | -        | -       | -        | 81    |
| vanadio           | mg/L     |                                                      |                      | <0.0004                 | 0.0044   | 0.0007   | 0.00079 | 0.0005   | 81    |
| zinc              | mg/L     |                                                      |                      | <0.001                  | 0.012    | 0.0025   | 0.00241 | 0.00177  | 81    |
| zirconio          | mg/L     |                                                      |                      | <0.002                  | <0.01    | -        | -       | -        | 81    |
| Total Metales     |          |                                                      |                      |                         |          |          |         |          |       |
| aluminio          | mg/L     | 0.2                                                  | P                    | 0.009                   | 17.9     | 0.13     | 0.57144 | 2.0313   | 80    |
| antimonio         | mg/L     | 0.005                                                | P                    | <0.0002                 | <0.001   | -        | -       | -        | 81    |
| arsénico          | mg/L     | 0.01                                                 | P                    | <0.0002                 | 0.0005   | <0.0002  | 0.0003  | 0.0002   | 81    |
| bario             | mg/L     | 0.7                                                  | P                    | 0.0038                  | 0.152    | 0.015    | 0.01703 | 0.01579  | 81    |
| berilio           | mg/L     | 0.0146                                               | ORNL                 | <0.0002                 | 0.0005   | <0.0002  | 0.0003  | 0.0002   | 81    |
| bismuto           | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -        | -       | -        | 81    |

Tabla 13      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Humana (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Notas <sup>(c)</sup> | Stastics <sup>(b)</sup> |          |         |         |          |       |
|-----------|----------|------------------------------------------------------|----------------------|-------------------------|----------|---------|---------|----------|-------|
|           |          |                                                      |                      | Minimum                 | Maximum  | Median  | Average | St. Dev. | Count |
| boro      | mg/L     | 5                                                    | CCME                 | <0.01                   | 0.1      | 0.01    | 0.0171  | 0.01721  | 81    |
| cadmio    | mg/L     | 0.003                                                | P                    | <0.00004                | 0.0002   | 0.0001  | 6.5E-05 | 4.5E-05  | 81    |
| calcio    | mg/L     |                                                      |                      | 1.5                     | 6.74     | 3.95    | 4.03463 | 1.13332  | 81    |
| cromo     | mg/L     | 0.05                                                 | P                    | <0.0002                 | 0.0029   | 0.0005  | 0.00038 | 0.00035  | 81    |
| cobalto   | mg/L     |                                                      |                      | <0.0002                 | 0.018    | 0.0005  | 0.00064 | 0.00201  | 81    |
| cobre     | mg/L     | 1                                                    | P                    | <0.0003                 | 0.04     | 0.0014  | 0.00454 | 0.00624  | 81    |
| hierro    | mg/L     | 0.3                                                  | P                    | <0.03                   | 12.7     | 0.25    | 0.50444 | 1.43694  | 81    |
| plomo     | mg/L     | 0.01                                                 | P                    | <0.0002                 | 0.004    | 0.0004  | 0.00041 | 0.00062  | 81    |
| litio     | mg/L     | 0.0146                                               | ORNL                 | <0.0002                 | 0.0071   | 0.0005  | 0.00048 | 0.0008   | 81    |
| magnesio  | mg/L     |                                                      |                      | 0.63                    | 3.8      | 1.67    | 1.83216 | 0.63972  | 81    |
| manganeso | mg/L     | 0.1                                                  | P                    | 0.0025                  | 1.09     | 0.019   | 0.04641 | 0.1247   | 81    |
| mercurio  | mg/L     | 0.001                                                | P                    | <0.00002                | <0.00002 | -       | -       | -        | 81    |
| molibdeno | mg/L     | 0.07                                                 | P                    | <0.0001                 | 0.001    | 0.00025 | 0.00028 | 0.00024  | 81    |
| níquel    | mg/L     | 0.02                                                 | P                    | <0.0002                 | 0.0026   | 0.0005  | 0.00035 | 0.00032  | 81    |
| fósforo   | mg/L     | 0.000146                                             | ORNL                 | <0.03                   | 0.15     | 0.05    | 0.04617 | 0.03189  | 81    |
| potasio   | mg/L     |                                                      |                      | 0.52                    | 1.6      | 0.7     | 0.69432 | 0.14566  | 81    |
| selenio   | mg/L     | 0.01                                                 | P                    | <0.0002                 | 0.003    | <0.0002 | 0.00046 | 0.00058  | 81    |
| silicio   | mg/L     |                                                      |                      | 4.445                   | 14.7     | 7.6     | 7.68179 | 1.93182  | 81    |
| plata     | mg/L     | 0.05                                                 | P                    | <0.00005                | 0.0003   | 0.00006 | 7.6E-05 | 5.5E-05  | 81    |
| sodio     | mg/L     | ≤ 200                                                | CCME                 | 2.03                    | 7.29     | 3.7     | 3.74469 | 0.93699  | 81    |
| estroncio | mg/L     | 4.4                                                  | ORNL                 | 0.0098                  | 0.052    | 0.03    | 0.03111 | 0.0092   | 81    |
| telurio   | mg/L     |                                                      |                      | <0.0002                 | <0.001   | -       | -       | -        | 81    |
| talio     | mg/L     |                                                      |                      | <0.00001                | 0.0004   | 0.00001 | 3.2E-05 | 5E-05    | 81    |
| toro      | mg/L     |                                                      |                      | <0.0001                 | 0.0008   | <0.0001 | 0.00016 | 0.00012  | 81    |
| estaño    | mg/L     | 4.4                                                  | ORNL                 | <0.0002                 | 0.0008   | <0.0002 | 0.0003  | 0.00021  | 81    |
| titanio   | mg/L     |                                                      |                      | <0.0004                 | 0.0375   | 0.002   | 0.00424 | 0.00611  | 81    |
| uranio    | mg/L     | 0.02                                                 | CCME                 | <0.0001                 | 0.00025  | <0.0001 | 0.00015 | 0.0001   | 81    |
| vanadio   | mg/L     |                                                      |                      | <0.0004                 | 0.024    | 0.0009  | 0.00138 | 0.00276  | 81    |
| zinc      | mg/L     | 5                                                    | P                    | <0.001                  | 0.046    | 0.0025  | 0.00319 | 0.00564  | 81    |
| zirconio  | mg/L     |                                                      |                      | <0.002                  | <0.19    | -       | -       | -        | 81    |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

<sup>(c)</sup> P: Reglamento panameño 351 Concentraciones máximas permisibles en el agua potable (1999);AO: Objetivo estético

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la Salud Humana.

CCME: Consejo Canadiense de Ministros del Medio Ambiente, Health Canada Guidelines for Canadian Drinking Water Quality (2008);

ORNL: Niveles de análisis del agua del grifo del Oak Ridge National Laboratory para contaminantes químicos en sitios del Superfondo (lineamientos ajustados para reflejar un ILCR de 10-5, HQ de 0.2) (Septiembre 2008).

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |        |        |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 28.5   | 24.4 C | 24.8   |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5      | 6.03   | 5.86   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 80     | 50     | 257    |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 274    | 188    | 60     |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.37   | 0.7    | 3.12   |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.22   | 5.5    | 5.58   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 66     | 48     | 48     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.7   | 10.4   | 9.9    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 16.5   | 10.5   | 10.2   |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 53     | 43     | 36     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6      | < 4    | 2      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.5    | 2.8    | 3.7    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.5    | 3.5    | 4.6    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01  | <0.01  | <0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02   | 0.05   | 0.04   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | 0.04   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | <0.002 | <0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.2   | <0.2   | <0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.01   | 3.66   | 4.31   |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.05  | <0.05  | <0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 17.8   | 11.2   | 11.3   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |          |          |         |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|---------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09  |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |         |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.2     | <0.2     | <0.2    |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 126      | <10      | <10     |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1        | <1       | 2.2     |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3        | 10       | 3       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <2       | <2       | <2      |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | <0.001   | <0.001  |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0        | -        | -       |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0        | -        | -       |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |         |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002  |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002  | <0.002   | <0.002  |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |         |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.01     | 0.15     | 0.081   |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016    | 0.013    | 0.014   |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01   |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | <0.00004 | 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.71     | 1.8      | 1.82    |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0022   | 0.0009   | 0.0011  |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006   | 0.0031   | 0.0032  |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | 0.06     | 0.06    |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002 |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |          |          |          |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| litio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | 0.0005   | 0.0005   |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.93     | 1.43     | 1.29     |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.085    | 0.082    | 0.065    |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0005   | 0.0004   |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.21     | 0.24     | 0.24     |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0005   | <0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.16     | 6.5      | 4.24     |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.57     | 2.92     | 2.83     |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.018    | 0.013    | 0.012    |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | <0.0002  | <0.0002  |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.016    | 0.012    | 0.013    |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.087    | 0.097    | 0.13     |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0002   | <0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017    | 0.013    | 0.014    |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01    |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W26 |        |        |        |        |        |        |        |         |          |          |          |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| cadmio    | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.00005  | <0.00004 | <0.00004 |
| calcio    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.78     | 1.84     | 1.87     |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0011   | 0.0027   | 0.0009   |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0018   | 0.003    | 0.0029   |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.17     | 0.08     | 0.12     |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | 0.0005   | 0.0005   |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.32     | 1.43     | 1.35     |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.089    | 0.101    | 0.07     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0007   | 0.0005   |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.21     | 0.26     | 0.25     |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0006   | <0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.83     | 6.48     | 4.29     |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.05     | 2.91     | 3.01     |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.019    | 0.013    | 0.012    |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | <0.0002  | 0.0005   |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | <0.0002  | <0.0002  |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017    | 0.011    | 0.011    |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |



Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |        |        |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 26.3   | 24.4   | 23.4   |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.05   | 7.56   | 7.46   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90     | 70     | 266    |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 261    | 232    | 80     |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4    | 0.33   | 1.07   |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.74   | 7.4    | 7.65   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 79     | 60     | 68     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 23.3   | 19.9   | 20.4   |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.8   | 19.9   | 21.4   |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 78     | 52     | 60     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6      | 2      | 4      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 36.2   | 23.6   | 29.8   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44.2   | 28.8   | 36.4   |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01  | 0.02   | <0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.22   | 0.25   | 0.25   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | 0.25   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | <0.002 | <0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3    | <0.2   | <0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.4    | 4.52   | 5.49   |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.05  | <0.05  | <0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.56   | 0.97   | 0.78   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |          |         |          |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|---------|----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08  | Feb-09   |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |          |         |          |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3      | <0.2    | <0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 132      | <20     | 12       |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <1       | <1      | <1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3        | 3       | <2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <2       | <2      | <2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | <0.001  | <0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 500      | 0       | -        |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 100      | 0       | -        |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |          |         |          |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002  | <0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002  | <0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |          |         |          |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.004    | 0.008   | 0.007    |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013    | 0.011   | 0.011    |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | 0.01    | <0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | 0.00009 | <0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.77     | 4.7     | 4.95     |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007   | <0.0002 | 0.005    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | 0.0003  | 0.0012   |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | 0.01    | <0.01    |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002 | <0.0002  |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |          |          |          |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| litio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.16     | 1.99     | 1.96     |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004   | <0.0002  | 0.0082   |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | 0.0007   |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.74     | 0.81     | 0.69     |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13       | 11.9     | 10       |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.41     | 4.13     | 4.14     |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.053    | 0.04     | 0.043    |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005   | 0.0008   | 0.0006   |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016   | 0.0011   | 0.0011   |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | <0.001   | 0.024    |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.039    | 0.047    | 0.042    |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.015    | 0.011    | 0.012    |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01    |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W28 |        |        |        |        |        |        |        |         |          |          |          |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| cadmio    | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | 0.0001   | <0.00004 |
| calcio    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.09     | 4.66     | 5.15     |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0005   | 0.0005   |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04     | 0.03     | 0.05     |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.58     | 2        | 2.07     |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0035   | 0.0018   | 0.0049   |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.73     | 0.78     | 0.69     |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 14.1     | 11.8     | 10.2     |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.04     | 4.03     | 4.24     |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.057    | 0.039    | 0.044    |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014   | 0.0017   | 0.0012   |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016   | 0.0011   | 0.0013   |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002    | <0.001   | 0.001    |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |        |        |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 29.7   | 23.4 C | 25.7   |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.2    | 7      | 6.5    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90     | 50     | 211    |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 260    | 180    | 40     |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.55   | 0.68   | 0.71   |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.41   | 6.93   | 7.39   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 56     | 40     | 51     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 16.2   | 11.6   | 10.1   |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 18     | 11.5   | 10.2   |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 32     | 44     | 36     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <1     | <1     | 2      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 20.9   | 10.4   | 18.8   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.5   | 12.6   | 23     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01  | <0.01  | <0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.1    | 0.09   | 0.09   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | 0.09   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | <0.002 | <0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4    | <0.2   | 0.2    |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.14   | 4.26   | 4.41   |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.05  | <0.05  | <0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.42   | 3.09   | 2.96   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |          |          |          |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4      | <0.2     | 0.2      |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <20      | <10      | <10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.7      | 1.3      | <1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2      | 8        | <2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2      | <2       | <2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | <0.001   | <0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 18,300   | -        | -        |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8,300    | -        | -        |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002    | 0.017    | 0.019    |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | 0.0002   |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0066   | 0.0056   | 0.0058   |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | <0.00004 | <0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.25     | 2.68     | 2.42     |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0044   | 0.0068   |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0008   | 0.001    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | 0.02     | 0.05     |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0003   | 0.0003   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |          |          |          |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.36     | 1.19     | 0.98     |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0066   | 0.015    | 0.02     |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0007   | 0.0009   |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.19     | 0.22     | 0.2      |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.75     | 4.55     | 2.8      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.4      | 2.66     | 2.46     |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.022    | 0.015    | 0.012    |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0003   | 0.0003   |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | <0.0002  | <0.0002  |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | 0.002    | 0.003    |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.014    | 0.044    | 0.045    |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0003   | <0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0074   | 0.0059   | 0.0061   |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01    |
| cadmio          | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | <0.00004 | <0.00004 |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W29 |        |        |        |        |        |        |        |         |          |          |          |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| calcio    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.58     | 2.64     | 2.39     |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006   | 0.0005   | 0.0005   |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07     | 0.07     | 0.08     |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0003   | 0.0003   |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.6      | 1.19     | 1.01     |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0037   | 0.0063   | 0.0085   |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03    | <0.03    | <0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.28     | 0.24     | 0.2      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0007   | <0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.94     | 4.61     | 2.83     |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00005 | <0.00005 | <0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.77     | 2.6      | 2.48     |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.023    | 0.015    | 0.013    |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002 | <0.00002 | <0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003   | 0.0005   | 0.0003   |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001  | <0.0001  | <0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | 0.0002   | <0.0002  |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002    | 0.001    | 0.001    |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |



Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |        |        |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|--------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08 | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 26.5   | 22.8   | 25.9   |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.85   | 6.81   | 6.64   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 40     | 40     | 548    |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 269    | 261    | 50     |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.49   | 0.21   | 0.61   |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.1    | 6.86   | 7.04   |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 33     | 35     | 44     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.5    | 8.1    | 11.1   |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8      | 8.6    | 11.1   |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 24     | 26     | 26     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1      | <1     | <1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 12.6   | 10.4   | 15.8   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 15.3   | 12.7   | 19.3   |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.5   | <0.5   | <0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01  | <0.01  | <0.01  |
| nitrate y nitrite (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04   | 0.05   | 0.04   |
| nitrate (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -      | -      | 0.04   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002 | <0.002 | <0.002 |
| nitrógeno Kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3    | <0.2   | <0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |        |        |        |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.64   | 4.81   | 5.68   |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.05  | <0.05  | <0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.25   | 0.96   | 0.88   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |          |          |          |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|----------|----------|----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08   | Feb-09   |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3      | <0.2     | <0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <20      | <20      | <10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.2      | 1.6      | 1.2      |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3        | 5        | <2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <2       | < 2      | <2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.001   | <0.001   | <0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9,300    | 6,800    | -        |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,700    | 1,200    | -        |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.002   | <0.002   | <0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |          |          |          |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.19     | 0.044    | 0.02     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.006    | 0.0082   | 0.011    |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | < 0.0002 |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.01    | <0.01    | <0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00004 | <0.00004 | <0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.39     | 1.59     | 2.29     |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002   | <0.0002  | <0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0048   | 0.0024   | 0.0015   |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012   | 0.0008   | 0.0027   |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.24     | 0.04     | 0.07     |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | <0.0002  | <0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002  | 0.0004   | 0.0007   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |           |           |           |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.74      | 1         | 1.31      |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0089    | 0.0051    | 0.0041    |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.00002  | <0.00002  | <0.00002  |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0001   | <0.0001   | <0.0001   |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0004    | 0.0004    |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.03     | <0.03     | <0.03     |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.34      | 0.4       |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | <0.0002   | <0.0002   | <0.0002   |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.29      | 5.47      | 5.25      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.34      | 3.04      | 3.65      |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.015     | 0.016     | 0.024     |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008     | 0.0011    | 0.0005    |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.0003    | 0.0003    |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.002     | 0.002     |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.11      | 0.075     | 0.03      |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0077    | 0.0086    | 0.011     |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.67      | 1.69      | 2.25      |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W30 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014    | 0.0005    | 0.0008    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.2       | 0.08      | 0.09      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | 0.0006    |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.93      | 1.05      | 1.33      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0019    | 0.0015    | 0.0023    |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.38      | 0.4       |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.35      | 5.87      | 5.19      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.53      | 3.28      | 3.64      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.017     | 0.016     | 0.024     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0026    | 0.0013    | 0.0007    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.0004    | 0.0003    |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.002     | 0.002     |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W33 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27.3    | 24.5C   | 24      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.4     | 7.6     | 7.6     |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 90      | 70      | 199     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 252     | 200     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.47    | 1.34    | 1.42    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.82    | 7.56    | 7.6     |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 79      | 59      | 61      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.8    | 21.4    | 20.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 28.5    | 21.4    | 20.3    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 68      | 48      | 53      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8       | < 1     | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 42.2    | 25.6    | 30.6    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 51.4    | 31.2    | 37.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04    | < 0.01  | < 0.01  |
| nitrate y nitrite (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07    | 0.03    | 0.13    |
| nitrate (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.13    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.33    | 3.35    | 4.31    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | 0.631   | < 0.5   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W33 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20      | < 10      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.1       | < 1       | 1.1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3         | 9         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 8,700     | -         | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,000     | -         | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.008     | 0.023     | 0.011     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0097    | 0.0078    | 0.0095    |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.17      | 3.84      | 3.91      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0005    |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0004    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0006    | 0.001     |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W33 |        |        |        |        |        |        |        |         |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.12      | 2.88      | 2.58      |
| manganeso              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0014    | 0.0012    |
| mercurio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.37      | 0.27      | 0.29      |
| selenio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 10.3      | 11.3      | 7.68      |
| plata                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.97      | 3.08      | 3.21      |
| estroncio              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.025     | 0.024     |
| telurio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | 0.0011    | 0.0007    |
| uranio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0021    | 0.0012    | 0.0012    |
| zinc                   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.01      | 0.001     |
| zirconio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.021     | 0.047     | 0.051     |
| antimonio              | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.011     | 0.008     | 0.0099    |
| berilio                | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5.4       | 3.87      | 3.78      |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W33 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0005    | 0.0007    |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0005    | 0.0005    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04      | 0.03      | 0.06      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.64      | 2.84      | 2.64      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0033    | 0.0028    | 0.0064    |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.38      | 0.27      | 0.26      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0008    | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 10.8      | 11.5      | 7.42      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | 0.001     | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.34      | 3.03      | 3.12      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.027     | 0.024     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | 0.00002   | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0026    | 0.0015    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.002     | 0.0013    | 0.0013    |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | < 0.001   | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27      | 25      | 24      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.3     | 7.5     | 7.36    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 80      | 70      | 198     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 261     | 245     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.06    | 1.83    | 0.84    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.72    | 7.38    | 7.52    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 74      | 52      | 64      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 21.8    | 12.8    | 18.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 22.6    | 13.3    | 18.9    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 59      | 27      | 60      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 15      | 3       | 9       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 34.4    | 19.7    | 28.2    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 42      | 24      | 34.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.18    | 0.14    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.07    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3     | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.72    | 4.39    | 4.27    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.84    | 1.33    | 1.64    |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.3       | 0.3       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20      | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.1       | < 1       | < 1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3         | 4         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4,600     | 7,200     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1,600     | 1,200     | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003     | 0.009     | 0.004     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0002    |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.046     | 0.03      | 0.041     |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.31      | 4.08      | 6.14      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0033    | 0.0051    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0009    | 0.0005    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.86      | 0.63      | 0.79      |
| manganeso              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0061    | 0.0084    |
| mercurio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0005    | 0.0005    |
| fósforo                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.26      | 0.26      | 0.29      |
| selenio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.63      | 8.47      | 7.18      |
| plata                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.31      | 4.56      | 4.71      |
| estroncio              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.067     | 0.04      | 0.053     |
| telurio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0002    | 0.0003    |
| uranio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0002    | 0.0003    |
| zinc                   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.001     | 0.002     |
| zirconio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.005     | 0.025     | 0.066     |
| antimonio              | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.049     | 0.03      | 0.043     |
| berilio                | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.46      | 4.27      | 6.24      |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W35 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0003    | 0.0003    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.02      | 0.02      | 0.07      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0006    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.96      | 0.65      | 0.81      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.0011    | 0.008     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.26      | 0.29      | 0.3       |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.78      | 8.62      | 7.33      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.88      | 4.73      | 4.74      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.069     | 0.041     | 0.055     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0004    | 0.0005    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0002    | 0.0004    |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | < 0.001   | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 27.5    | 25.6 C  | 25.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 6.1     | 6.65    | 6.47    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 60      | 40      | 212     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 247     | 201     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.15    | 2.92    | 1.79    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.07    | 6.67    | 6.83    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 53      | 40      | 44      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.8    | 8.8     | 21.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 13.4    | 8.9     | 10      |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 46      | 24      | 42      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1       | 1       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 25.6    | 15.1    | 20.4    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 31.3    | 18.4    | 24.9    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.09    | < 0.01  | 0.05    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.07    | 0.12    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | -      | -       | -       | -       | 0.09    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.5     | < 0.2   | < 0.2   |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Aniones                              |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cloruro                              | mg/L        | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.61      | 3.29      | 3.63      |
| fluoruro                             | mg/L        | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.05    | < 0.05    | < 0.05    |
| sulfato                              | mg/L        | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.58      | 0.64      | 0.55      |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 20      | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.7       | 1.1       | < 1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4         | 4         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3,000     | 1,100     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 200       | 400       | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.003     | 0.013     | 0.039     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.039     | 0.031     | 0.0081    |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.22      | 2.18      | 3.61      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0016    |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0012    | 0.0025    | 0.0009    |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |           |           |           |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cobre           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0004    | 0.0008    | 0.0007    |
| hierro          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.16      | 0.14      | 0.05      |
| plomo           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.9       | 0.81      | 3.06      |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.024     | 0.047     | 0.0045    |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | 0.0003    | 0.0003    |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.71      | 0.55      | 0.41      |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.01      | 8.5       | 8.82      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.61      | 3.52      | 2.61      |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.02      | 0.019     |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0005    | 0.0003    | 0.0018    |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | < 0.0002  | 0.0023    |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.003     | < 0.001   |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.028     | 0.023     | 0.019     |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.047     | 0.032     | 0.039     |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W36 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 3.6       | 2.18      | 2.57      |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0002    | 0.0003    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.21      | 0.19      | 0.33      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | 0.0003    |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.07      | 0.83      | 0.86      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.04      | 0.026     | 0.02      |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.05      | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 2.25      | 0.55      | 0.56      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9.21      | 8.85      | 7.17      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4.68      | 3.6       | 3.6       |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.035     | 0.02      | 0.024     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0007    | 0.0004    | 0.0007    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0002    | < 0.0002  |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.005     | 0.002     | 0.001     |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |



Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |        |       |          |                |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|-------|----------|----------------|--------|
|                                                               |                                         |                                                      | Mínimo                     | Máximo | Media | Promedio | Desv. Estándar | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |       |          |                |        |
| temperatura                                                   | °C                                      | ≤15                                                  | 22.8                       | 29.7   | 25.7  | 25.7882  | 1.84928        | 17     |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 5                          | 7.6    | 7     | 6.1      | -              | 21     |
| conductividad                                                 | μS/cm                                   |                                                      | 40                         | 548    | 80    | 133.857  | 121.307        | 21     |
| redox                                                         | mV                                      |                                                      | 40                         | 274    | 201   | 178.619  | 90.0852        | 21     |
| turbidez                                                      | NTU                                     | 1                                                    | 0.21                       | 3.12   | 1.07  | 1.28857  | 0.92292        | 21     |
| General Parámetros                                            |                                         |                                                      |                            |        |       |          |                |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 5.5                        | 7.82   | 7.38  | 6.44216  | -              | 21     |
| conductividad                                                 | μS/cm                                   |                                                      | 33                         | 79     | 53    | 54.9524  | 13.5369        | 21     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 6.5                        | 25.8   | 14.7  | 15.4857  | 5.82875        | 21     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 8                          | 28.5   | 13.4  | 15.6667  | 6.1612         | 21     |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | 24                         | 78     | 44    | 44.619   | 15.3638        | 21     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | <1                         | 15     | 2     | 3.19048  | 3.72651        | 21     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 2.8                        | 42.2   | 20.4  | 20.5381  | 10.9382        | 21     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 3.5                        | 51.4   | 24.9  | 25.0619  | 13.3338        | 21     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | <0.5                       | <0.5   | -     | -        | -              | 21     |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | <0.5                       | <0.5   | -     | -        | -              | 21     |
| Nutrientes                                                    |                                         |                                                      |                            |        |       |          |                |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | <0.01                      | 0.09   | <0.01 | 0.01357  | 0.0214         | 21     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.02                       | 0.25   | 0.09  | 0.1019   | 0.07026        | 21     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.04                       | 0.25   | 0.09  | 0.10143  | 0.07267        | 7      |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | <0.002                     | <0.002 | -     | -        | -              | 21     |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | <0.2                       | 0.5    | <0.2  | <0.2     | 0.12364        | 21     |
| Aniones                                                       |                                         |                                                      |                            |        |       |          |                |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 3.29                       | 5.68   | 4.26  | 4.20143  | 0.69777        | 21     |
| fluoruro                                                      | mg/L                                    | 1                                                    | <0.05                      | <0.05  | -     | -        | -              | 21     |
| sulfato                                                       | mg/L                                    | 250                                                  | <0.5                       | 17.8   | 0.97  | 3.04195  | 4.62618        | 21     |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |         |          |          |                |        |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|---------|----------|----------|----------------|--------|
|                                      |             |                                                      | Mínimo                     | Máximo  | Media    | Promedio | Desv. Estándar | Conteo |
| Orgánicos                            |             |                                                      |                            |         |          |          |                |        |
| nitrógeno orgánico total             | mg/L        |                                                      | <0.2                       | 0.4     | <0.2     | <0.2     | 0.11233        | 21     |
| demanda química de oxígeno           | mg/L        |                                                      | <10                        | 132     | 10       | 19.2857  | 36.5775        | 21     |
| carbono orgánico disuelto            | mg/L como C |                                                      | <1                         | 3.2     | 1.1      | 1.18095  | 0.82923        | 21     |
| aceite y grasa totales               | mg/L        |                                                      | <2                         | 10      | 3        | 3.42857  | 2.65653        | 21     |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | <2                         | <2      | -        | -        | -              | 21     |
| fenoles totales                      | mg/L        | 0.001                                                | <0.001                     | <0.001  | -        | -        | -              | 21     |
| coliformes totales                   | CFU/100mL   |                                                      | 0                          | 18,300  | 4,600    | 5,409.09 | 5,522.04       | 11     |
| coliformes fecales                   | CFU/100mL   |                                                      | 0                          | 8,300   | 1,000    | 1,609.09 | 2,464.73       | 11     |
| Especies de Cianuro                  |             |                                                      |                            |         |          |          |                |        |
| cianuro total                        | mg/L        | 0.001                                                | <0.002                     | <0.002  | -        | -        | -              | 21     |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | <0.002                     | <0.002  | -        | -        | -              | 21     |
| Metales Disueltos                    |             |                                                      |                            |         |          |          |                |        |
| aluminio                             | mg/L        |                                                      | 0.002                      | 0.19    | 0.011    | 0.03167  | 0.04992        | 21     |
| antimonio                            | mg/L        |                                                      | <0.0002                    | 0.0002  | <0.0002  | <0.0002  | 3E-05          | 21     |
| arsénico                             | mg/L        |                                                      | <0.0002                    | 0.0002  | <0.0002  | <0.0002  | 2.2E-05        | 21     |
| bario                                | mg/L        |                                                      | 0.0056                     | 0.046   | 0.011    | 0.01635  | 0.01273        | 21     |
| berilio                              | mg/L        |                                                      | <0.0002                    | <0.0002 | -        | -        | -              | 21     |
| bismuto                              | mg/L        |                                                      | <0.0002                    | <0.0002 | -        | -        | -              | 21     |
| boro                                 | mg/L        |                                                      | <0.01                      | 0.01    | <0.01    | <0.01    | 0.00109        | 21     |
| cadmio                               | mg/L        |                                                      | <0.00004                   | 0.00009 | <0.00004 | <0.00004 | 1.6E-05        | 21     |
| calcio                               | mg/L        |                                                      | 1.39                       | 7.31    | 3.61     | 3.61095  | 1.63503        | 21     |
| cromo                                | mg/L        |                                                      | <0.0002                    | 0.0016  | <0.0002  | 0.00023  | 0.00034        | 21     |
| cobalto                              | mg/L        |                                                      | <0.0002                    | 0.0068  | 0.0012   | 0.00208  | 0.00205        | 21     |
| cobre                                | mg/L        |                                                      | 0.0002                     | 0.0032  | 0.0008   | 0.001    | 0.00089        | 21     |
| hierro                               | mg/L        |                                                      | <0.01                      | 0.24    | 0.01     | 0.04524  | 0.06296        | 21     |
| plomo                                | mg/L        |                                                      | <0.0002                    | <0.0002 | -        | -        | -              | 21     |
| litio                                | mg/L        |                                                      | <0.0002                    | 0.0007  | <0.0002  | 0.00022  | 0.00018        | 21     |
| magnesio                             | mg/L        |                                                      | 0.63                       | 3.12    | 1.31     | 1.57     | 0.80323        | 21     |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |          |          |                |        |
|------------------------|----------|------------------------------------------------------|----------------------------|----------|----------|----------|----------------|--------|
|                        |          |                                                      | Mínimo                     | Máximo   | Media    | Promedio | Desv. Estándar | Conteo |
| manganeso              | mg/L     |                                                      | <0.0002                    | 0.085    | 0.0066   | 0.01877  | 0.02697        | 21     |
| mercurio               | mg/L     |                                                      | <0.00002                   | <0.00002 | -        | -        | -              | 21     |
| molibdeno              | ug/L     |                                                      | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| níquel                 | mg/L     |                                                      | <0.0002                    | 0.0009   | 0.0004   | 0.00037  | 0.00026        | 21     |
| fósforo                | mg/L     |                                                      | <0.03                      | <0.03    | -        | -        | -              | 21     |
| potasio                | mg/L     |                                                      | 0.19                       | 0.81     | 0.29     | 0.38381  | 0.19628        | 21     |
| selenio                | mg/L     |                                                      | <0.0002                    | 0.0005   | <0.0002  | <0.0002  | 0.00012        | 21     |
| sílice                 | mg/L     |                                                      | 2.8                        | 13       | 7.63     | 7.51429  | 2.8314         | 21     |
| plata                  | mg/L     |                                                      | <0.00005                   | <0.00005 | -        | -        | -              | 21     |
| sodio                  | mg/L     |                                                      | 2.34                       | 4.71     | 3.21     | 3.38714  | 0.75246        | 21     |
| estroncio              | mg/L     |                                                      | 0.012                      | 0.067    | 0.024    | 0.02843  | 0.01561        | 21     |
| telurio                | mg/L     |                                                      | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| talio                  | mg/L     |                                                      | <0.00002                   | <0.00002 | -        | -        | -              | 21     |
| torio                  | mg/L     |                                                      | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| estaño                 | mg/L     |                                                      | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| titanio                | mg/L     |                                                      | <0.0002                    | 0.008    | 0.0005   | 0.0009   | 0.00168        | 21     |
| uranio                 | mg/L     |                                                      | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| vanadio                | mg/L     |                                                      | <0.0002                    | 0.0023   | 0.0003   | 0.00068  | 0.00069        | 21     |
| zinc                   | mg/L     |                                                      | <0.001                     | 0.024    | 0.002    | 0.00455  | 0.00652        | 21     |
| zirconio               | mg/L     |                                                      | <0.002                     | <0.002   | -        | -        | -              | 21     |
| <b>Metales Totales</b> |          |                                                      |                            |          |          |          |                |        |
| aluminio               | mg/L     | 0.2                                                  | 0.005                      | 0.13     | 0.044    | 0.04976  | 0.03323        | 21     |
| antimonio              | mg/L     | 0.005                                                | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| arsénico               | mg/L     | 0.01                                                 | <0.0002                    | 0.0003   | <0.0002  | <0.0002  | 6.2E-05        | 21     |
| bario                  | mg/L     | 0.7                                                  | 0.0059                     | 0.049    | 0.012    | 0.01893  | 0.01446        | 21     |
| berilio                | mg/L     | 0.0146                                               | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| bismuto                | mg/L     |                                                      | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| boro                   | mg/L     | 5                                                    | <0.01                      | <0.01    | -        | -        | -              | 21     |
| cadmio                 | mg/L     | 0.003                                                | <0.00004                   | 0.0001   | <0.00004 | <0.00004 | 1.8E-05        | 21     |
| calcio                 | mg/L     |                                                      | 1.67                       | 7.46     | 3.6      | 3.66571  | 1.69824        | 21     |

Tabla 14      Tabla de Análisis de Calidad de Agua Potable de Línea Base para la Evaluación del Riesgos a la Salud Humana y a la Ecología (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |          |          |                |        |
|-----------|----------|------------------------------------------------------|----------------------------|----------|----------|----------|----------------|--------|
|           |          |                                                      | Mínimo                     | Máximo   | Media    | Promedio | Desv. Estándar | Conteo |
| cromo     | mg/L     | 0.05                                                 | <0.0002                    | 0.0007   | <0.0002  | <0.0002  | 0.00016        | 21     |
| cobalto   | mg/L     |                                                      | <0.0002                    | 0.0027   | <0.0002  | 0.00031  | 0.00061        | 21     |
| cobre     | mg/L     | 1                                                    | 0.0002                     | 0.003    | 0.0005   | 0.00081  | 0.0008         | 21     |
| hierro    | mg/L     | 0.3                                                  | 0.02                       | 0.33     | 0.07     | 0.09762  | 0.07943        | 21     |
| plomo     | mg/L     | 0.01                                                 | <0.0002                    | 0.0006   | <0.0002  | <0.0002  | 0.00011        | 21     |
| litio     | mg/L     | 0.0146                                               | <0.0002                    | 0.0006   | <0.0002  | 0.00022  | 0.00018        | 21     |
| magnesio  | mg/L     |                                                      | 0.65                       | 3.64     | 1.33     | 1.57905  | 0.81917        | 21     |
| manganeso | mg/L     | 0.1                                                  | 0.0007                     | 0.101    | 0.0049   | 0.01918  | 0.03023        | 21     |
| mercurio  | mg/L     | 0.001                                                | <0.00002                   | <0.00002 | -        | -        | -              | 21     |
| molibdeno | mg/L     | 0.07                                                 | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| níquel    | mg/L     | 0.02                                                 | <0.0002                    | 0.0007   | <0.0002  | <0.0002  | 0.00017        | 21     |
| fósforo   | mg/L     | 0.000146                                             | <0.03                      | 0.05     | <0.03    | <0.03    | 0.00764        | 21     |
| potasio   | mg/L     |                                                      | 0.2                        | 2.25     | 0.3      | 0.4719   | 0.44371        | 21     |
| selenio   | mg/L     | 0.01                                                 | <0.0002                    | 0.0008   | <0.0002  | <0.0002  | 0.00022        | 21     |
| sílice    | mg/L     |                                                      | 2.83                       | 14.1     | 7.42     | 7.62714  | 2.95227        | 21     |
| plata     | mg/L     | 0.05                                                 | <0.00005                   | 0.001    | <0.00005 | 7.1E-05  | 0.00021        | 21     |
| sodio     | mg/L     | ≤ 200                                                | 2.48                       | 5.04     | 3.6      | 3.63333  | 0.8327         | 21     |
| estroncio | mg/L     | 4.4                                                  | 0.012                      | 0.069    | 0.024    | 0.02952  | 0.0161         | 21     |
| telurio   | mg/L     |                                                      | <0.0002                    | <0.0002  | -        | -        | -              | 21     |
| talio     | mg/L     |                                                      | <0.00002                   | 0.00002  | <0.00002 | <0.00002 | 2.2E-06        | 21     |
| torio     | mg/L     |                                                      | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| estaño    | mg/L     | 4.4                                                  | <0.0002                    | 0.0003   | <0.0002  | <0.0002  | 4.4E-05        | 21     |
| titanio   | mg/L     |                                                      | <0.0002                    | 0.0026   | 0.0007   | 0.00092  | 0.00072        | 21     |
| uranio    | mg/L     | 0.02                                                 | <0.0001                    | <0.0001  | -        | -        | -              | 21     |
| vanadio   | mg/L     |                                                      | <0.0002                    | 0.002    | 0.0003   | 0.0006   | 0.00058        | 21     |
| zinc      | mg/L     | 5                                                    | <0.001                     | 0.017    | 0.001    | 0.00307  | 0.00441        | 21     |
| zirconio  | mg/L     |                                                      | <0.002                     | <0.002   | -        | -        | -              | 21     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

0.3 - denota una excedencia por encima de los criterios seleccionados asociados a la salud

Tabla 15      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W15 |         |        |         |         |        |        |        |         |          |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|--------|---------|---------|--------|--------|--------|---------|----------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08   | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |        |         |         |        |        |        |         |          |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | 26      | -      | 24.4    | 28.5    | -      | -      | 26.6   | 28.5    | 28.6     | 23.2    | 25.1    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | -       | -      | -       | 8.1     | -      | -      | 7.2    | 7.64    | 8        | 7.25    | 7.26    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | 50      | -      | 60      | 80      | -      | -      | 70     | -       | 90       | 30      | 447     |
| redox                                                         | mV                                      |                                                      | -                          | 175     | -      | 127     | -       | -      | -      | 146    | -       | 243      | 242     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -      | 45      | -       | -      | -      | 6.13   | -       | 2.11     | 37.3    | 7.93    |
| General Parámetros                                            |                                         |                                                      |                            |         |        |         |         |        |        |        |         |          |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | 7.28    | -      | 6.61    | 7.44    | -      | -      | 7.38   | 7.75    | 7.714971 | 6.78    | 7.46    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | 49      | -      | 52      | 73      | -      | -      | 70     | 75      | 75.5     | 28      | 59      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 16      | -      | 14      | 22      | -      | -      | 21     | 28      | 23.3     | 7.5     | 18      |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 16      | -      | 15      | 21      | -      | -      | 24     | 24      | 26.4     | 9.2     | 18      |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | -                          | 61      | -      | 33      | 66      | -      | -      | 74     | 65      | 65       | 19      | 52      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | 30      | -      | 35      | 2       | -      | -      | 7      | 1       | 2        | 71      | 13      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | 18.2    | -      | 19.1    | 23.7    | -      | -      | 20.5   | 30      | 32.55    | 9.1     | 23.2    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | 22.2    | -      | 23.2    | 28.9    | -      | -      | 25     | 36.6    | 39.7     | 11.1    | 28.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |        |         |         |        |        |        |         |          |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | -      | -      | 0.02   | 0.02    | 0.01     | 0.02    | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | 0.08    | -      | 0.14    | < 0.05  | -      | -      | 0.06   | < 0.05  | 0.02     | 0.13    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | 0.08    | -      | 0.14    | < 0.05  | -      | -      | 0.06   | < 0.05  | -        | -       | 0.08    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | < 0.002  | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | 0.4     | -      | 0.5     | < 0.2   | -      | -      | 0.3    | < 0.2   | < 0.2    | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |        |         |         |        |        |        |         |          |         |         |
| Cloruro                                                       | mg/L                                    | 250                                                  | -                          | 2.99    | -      | 3.62    | 4.25    | -      | -      | 3.79   | 3.84    | 3.66     | 2.05    | 4.57    |
| Fluoruro                                                      | mg/L                                    | 1                                                    | -                          | < 0.05  | -      | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | < 0.05   | < 0.05  | < 0.05  |
| Sulfato                                                       | mg/L                                    | 250                                                  | -                          | 2.05    | -      | 2.28    | 3.36    | -      | -      | 6.16   | 3.81    | 4.58     | 2.14    | 2.88    |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W15 |          |        |          |          |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|--------|----------|----------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |        |          |          |        |        |          |          |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | 0.4      | -      | 0.5      | < 0.2    | -      | -      | 0.3      | < 0.2    | < 0.2     | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | < 20     | -      | < 20     | 41       | -      | -      | 31       | < 20     | < 20      | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | 2.6      | -      | 2.6      | 1.2      | -      | -      | 2.8      | 1.2      | 2.7       | 2.6      | 1.4       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | 4        | < 2      | 4         | 3        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | < 2      | < 2      | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -        | -      | < 0.001  | -        | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -      | -      | 11,100   | 3,100    | 5,300     | 17,600   | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -      | -      | 3,300    | 2,800    | 2,350     | 2,500    | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |        |          |          |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |        |          |          |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      | -                          | 0.18     | -      | 0.13     | 0.024    | -      | -      | 0.039    | 0.026    | 0.0165    | 0.18     | 0.052     |
| antimonio                            | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | 0.014    | -      | 0.014    | 0.018    | -      | -      | 0.018    | 0.022    | 0.0195    | 0.0098   | 0.017     |
| berilio                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | < 0.05   | -      | < 0.05   | 0.05     | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00017  | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | 3.97     | -      | 3.63     | 5.27     | -      | -      | 5.41     | 6.89     | 6.13      | 1.84     | 4.45      |
| cromo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | 0.0002    |
| cobalto                              | mg/L        |                                                      | -                          | 0.003    | -      | 0.002    | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.0007    | 0.0047   | 0.0022    |
| cobre                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.00065   | 0.0018   | 0.002     |
| hierro                               | mg/L        |                                                      | -                          | 0.2      | -      | 0.2      | 0.1      | -      | -      | 0.11     | 0.14     | 0.125     | 0.16     | 0.13      |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W15 |           |        |           |           |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| plomo                  | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                  | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio               | mg/L     |                                                      | -                          | 1.55      | -      | 1.28      | 2.08      | -      | -      | 1.93      | 2.57      | 1.94      | 0.71      | 1.68      |
| manganeso              | mg/L     |                                                      | -                          | 0.014     | -      | 0.005     | 0.01      | -      | -      | 0.01      | 0.009     | 0.00765   | 0.02      | 0.016     |
| mercurio               | mg/L     |                                                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | 0.002     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0008    | 0.0005    |
| fósforo                | mg/L     |                                                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | 0.8       | -      | 0.8       | 0.7       | -      | -      | 0.8       | 0.8       | 0.85      | 0.56      | 0.74      |
| selenio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | 7         | -      | 5.6       | 7.7       | -      | -      | 7.4       | 10        | 8.72      | 4.64      | 6.89      |
| plata                  | mg/L     |                                                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | 3.34      | -      | 3.21      | 4.03      | -      | -      | 3.83      | 5.14      | 3.78      | 2.02      | 3.88      |
| estroncio              | mg/L     |                                                      | -                          | 0.029     | -      | 0.027     | 0.041     | -      | -      | 0.039     | 0.052     | 0.05      | 0.014     | 0.035     |
| telurio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | 0.005     | -      | 0.005     | < 0.001   | -      | -      | 0.001     | 0.001     | 0.00105   | 0.0071    | 0.0016    |
| uranio                 | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | 0.001     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.001     | 0.0012    | 0.0009    | 0.0008    |
| zinc                   | mg/L     |                                                      | -                          | < 0.005   | -      | < 0.005   | 0.005     | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.001     |
| zirconio               | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | 0.54      | -      | 0.86      | 0.077     | -      | -      | 1.7       | 0.038     | 0.0455    | 1.01      | 0.22      |
| antimonio              | mg/L     | 0.005                                                | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | 0.02      | -      | 0.027     | 0.017     | -      | -      | 0.022     | 0.021     | 0.0215    | 0.024     | 0.02      |
| berilio                | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W15 |           |        |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| bismuto   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro      | mg/L     | 5                                                    | -                          | < 0.05    | -      | < 0.05    | 0.05      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio    | mg/L     | 0.003                                                | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00011   | < 0.00004 |
| calcio    | mg/L     |                                                      | -                          | 3.85      | -      | 3.75      | 4.99      | -      | -      | 5.92      | 6.18      | 6.63      | 2.13      | 4.37      |
| cromo     | mg/L     | 0.05                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0005    | 0.0002    |
| cobalto   | mg/L     |                                                      | -                          | < 0.001   | -      | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0012    | 0.0003    |
| cobre     | mg/L     | 1                                                    | -                          | 0.003     | -      | 0.004     | 0.001     | -      | -      | 0.001     | < 0.001   | 0.0008    | 0.0046    | 0.0013    |
| hierro    | mg/L     | 0.3                                                  | -                          | 0.62      | -      | 1.24      | 0.2       | -      | -      | 0.36      | 0.21      | 0.22      | 1.07      | 0.47      |
| plomo     | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | 0.0002    |
| magnesio  | mg/L     |                                                      | -                          | 1.51      | -      | 1.4       | 1.96      | -      | -      | 2.12      | 2.12      | 2.385     | 0.93      | 1.72      |
| manganeso | mg/L     | 0.1                                                  | -                          | 0.033     | -      | 0.086     | 0.011     | -      | -      | 0.025     | 0.009     | 0.0108    | 0.074     | 0.026     |
| mercurio  | mg/L     | 0.001                                                | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | 0.9       | -      | 0.9       | 0.7       | -      | -      | 0.9       | 0.7       | 0.885     | 0.64      | 0.73      |
| selenio   | mg/L     | 0.01                                                 | -                          | 0.001     | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | 7         | -      | 5.9       | 7.5       | -      | -      | 8         | 8.4       | 9.665     | 5.54      | 7.07      |
| plata     | mg/L     | 0.05                                                 | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | 3.17      | -      | 3.05      | 3.91      | -      | -      | 4.06      | 4.49      | 4.545     | 2.04      | 3.87      |
| estroncio | mg/L     | 4.4                                                  | -                          | 0.029     | -      | 0.029     | 0.039     | -      | -      | 0.043     | 0.048     | 0.054     | 0.018     | 0.037     |
| telurio   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | 0.006     | -      | 0.011     | 0.002     | -      | -      | 0.004     | 0.002     | 0.00115   | 0.017     | 0.0055    |
| uranio    | mg/L     | 0.02                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | 0.002     | -      | 0.004     | 0.001     | -      | -      | 0.001     | 0.001     | 0.00125   | 0.0035    | 0.0016    |



**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W15 |         |        |         |         |        |        |         |         |         |         |         |
|-----------|----------|------------------------------------------------------|----------------------------|---------|--------|---------|---------|--------|--------|---------|---------|---------|---------|---------|
|           |          |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| zinc      | mg/L     | 5                                                    | -                          | < 0.005 | -      | < 0.005 | < 0.005 | -      | -      | < 0.005 | < 0.005 | 0.0015  | 0.015   | < 0.001 |
| zirconio  | mg/L     |                                                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | -      | -      | < 0.09  | < 0.01  | < 0.002 | < 0.002 | < 0.002 |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W16 |         |        |         |          |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|--------|---------|----------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08   | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |        |         |          |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | 26.7    | -      | 24.2    | 27.5     | 29     | -      | 27.1   | 29.1    | 29.4   | 23.9    | 26.2    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | 6.61    | -      | 7.1     | 7.2      | 6.69   | -      | -      | 7.35    | 7.6    | 6.95    | 7.08    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 1,010   | -      | 70      | 640      | 71     | -      | 68     | -       | 3,920  | 50      | 458     |
| redox                                                         | mV                                      |                                                      | -                          | 194     | -      | 128     | -        | 990?   | -      | 144    | -       | 228    | 249     | 270     |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -      | 20.6    | -        | 4.16   | -      | 10.22  | -       | 3.98   | 99      | 3.39    |
| General Parámetros                                            |                                         |                                                      |                            |         |        |         |          |        |        |        |         |        |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | 7.43    | -      | 6.72    | 6.979885 | 7.61   | -      | 7.13   | 7.55    | 7.64   | 6.81    | 7.44    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 1,070   | -      | 67      | 554      | 973    | -      | 1,490  | 3,370   | 3,560  | 39      | 240     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 112     | -      | 19      | 59.5     | 112    | -      | 123    | 316     | 329    | 8.1     | 34.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 106     | -      | 18      | 59.5     | 107    | -      | 130    | 347     | 331    | 11.8    | 34.9    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | 581     | -      | 39      | 270.5    | 523    | -      | 739    | 1,810   | 1,760  | 21      | 138     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | 16      | -      | 17      | 4        | 4      | -      | 76     | 10      | 4      | 268     | 7       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | 23.7    | -      | 22.1    | 34.7     | 38.3   | -      | 21.4   | 36.2    | 42.5   | 10.6    | 27.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | 28.9    | -      | 27      | 42.3     | 46.8   | -      | 26.2   | 44.1    | 51.8   | 13      | 33.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5    | < 0.5  | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5    | < 0.5  | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |        |         |          |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | < 0.01  | -      | < 0.01  | 0.02     | 0.02   | -      | 0.09   | 0.04    | 0.05   | 0.05    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | < 0.05  | -      | 0.08    | 0.05     | 0.01   | -      | < 0.25 | 0.05    | 0.02   | 0.12    | 0.06    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | < 0.1   | -      | 0.08    | 0.05     | 0.01   | -      | < 0.25 | 0.05    | -      | -       | 0.06    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | < 0.002 | -      | < 0.002 | < 0.002  | 0.002  | -      | <0.002 | 0.003   | 0.004  | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | 0.4     | -      | 0.2     | < 0.2    | 0.4    | -      | 0.8    | < 0.2   | 0.5    | 0.8     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |        |         |          |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | 304     | -      | 5.99    | 142      | 249    | -      | 384    | 956     | 972    | 4.57    | 53.8    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | < 0.1   | -      | 0.05    | < 0.05   | < 0.1  | -      | < 0.25 | < 0.05  | < 0.5  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | 40.4    | -      | 2.02    | 19.65    | 34.6   | -      | 52.5   | 136     | 124    | 2.09    | 8.47    |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W16 |          |        |          |          |          |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|--------|----------|----------|----------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08   | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | 0.4      | -      | 0.2      | < 0.2    | 0.4      | -      | 0.7      | < 0.2    | 0.4       | 0.8       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | 23       | -      | 297      | 24       | < 20     | -      | 45       | < 20     | 187       | 72        | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | 4.1      | -      | 1.7      | 1.3      | 1.5      | -      | 5.9      | 1.5      | 1.6       | 2.3       | 1.4       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | 2        | -      | 4        | < 2      | 8         | 3         | 2         |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | 0.011    | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -        | -      | -        | 9,200    | 13,800    | 28,000    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -        | -      | -        | 2,400    | 5,300     | 2,800     | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |        |          |          |          |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | 0.15     | -      | 0.094    | 0.041    | < 0.005  | -      | 0.17     | 0.021    | 0.01      | 0.26      | 0.037     |
| antimonio                            | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | 0.0002    | 0.0003    |
| arsénico                             | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | 0.003    | 0.0007    | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | 0.025    | -      | 0.017    | 0.0235   | 0.027    | -      | 0.029    | 0.035    | 0.028     | 0.013     | 0.02      |
| berilio                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | 0.07     | -      | < 0.05   | < 0.05   | 0.06     | -      | 0.09     | 0.22     | 0.16      | < 0.01    | 0.02      |
| cadmio                               | mg/L        |                                                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | 10.7     | -      | 4.5      | 8.105    | 11.7     | -      | 11.1     | 24.6     | 25.2      | 1.85      | 5.85      |
| cromo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | 0.0007    | < 0.0002  | 0.0003    |
| cobalto                              | mg/L        |                                                      | -                          | < 0.001  | -      | 0.004    | 0.004    | < 0.001  | -      | < 0.001  | < 0.001  | 0.002     | 0.0031    | 0.0061    |
| cobre                                | mg/L        |                                                      | -                          | 0.001    | -      | < 0.001  | < 0.001  | < 0.001  | -      | 0.002    | 0.001    | 0.0009    | 0.0019    | 0.0015    |
| hierro                               | mg/L        |                                                      | -                          | 0.17     | -      | 0.19     | 0.115    | 0.09     | -      | 0.65     | 0.07     | 0.02      | 0.23      | 0.19      |
| plomo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | 0.0006    |
| litio                                | mg/L        |                                                      | -                          | 0.002    | -      | < 0.001  | < 0.001  | 0.002    | -      | 0.004    | 0.008    | 0.0062    | < 0.0002  | 0.0005    |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W16 |           |        |           |           |           |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | 20.6      | -      | 1.78      | 9.57      | 20        | -      | 23.3      | 61.7      | 64.5      | 0.85      | 4.83      |
| manganeso              | mg/L     |                                                      | -                          | 0.055     | -      | 0.033     | 0.0445    | 0.046     | -      | 0.073     | 0.099     | 0.062     | 0.04      | 0.037     |
| mercurio               | mg/L     |                                                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0006    | 0.0006    | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0004    | 0.0005    | 0.0008    |
| fósforo                | mg/L     |                                                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | 6.6       | -      | 0.9       | 3.1       | 6.3       | -      | 7.6       | 19.2      | 19        | 0.77      | 1.82      |
| selenio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | 9         | -      | 8         | 8.05      | 11.3      | -      | 7         | 9.1       | 10.5      | 5.81      | 7.83      |
| plata                  | mg/L     |                                                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | 163       | -      | 4.98      | 71.4      | 148       | -      | 181       | 519       | 513       | 3.69      | 29.8      |
| estroncio              | mg/L     |                                                      | -                          | 0.14      | -      | 0.036     | 0.0895    | 0.15      | -      | 0.18      | 0.42      | 0.437     | 0.016     | 0.062     |
| telurio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | 0.004     | -      | 0.003     | 0.001     | < 0.001   | -      | 0.002     | < 0.001   | 0.0008    | 0.0056    | 0.0017    |
| uranio                 | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | 0.002     | -      | 0.001     | 0.001     | < 0.001   | -      | 0.002     | 0.001     | 0.0014    | 0.002     | 0.0011    |
| zinc                   | mg/L     |                                                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio               | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |        |           |           |           |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | 0.4       | -      | 0.29      | -         | 0.052     | -      | 0.3       | 0.088     | 0.11      | 2.41      | 0.095     |
| antimonio              | mg/L     | 0.005                                                | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | 0.002     | 0.0008    | 0.0002    | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | 0.025     | -      | 0.021     | 0.021     | 0.026     | -      | 0.033     | 0.044     | 0.029     | 0.049     | 0.02      |
| berilio                | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | 0.06      | -      | < 0.05    | < 0.05    | 0.06      | -      | 0.09      | 0.27      | 0.18      | < 0.01    | 0.02      |
| cadmio                 | mg/L     | 0.003                                                | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | 10.1      | -      | 4.33      | 7.515     | 11.2      | -      | 11.9      | 28.3      | 25.6      | 2.41      | 5.82      |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W16 |           |        |           |           |           |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0002    | 0.0014    | 0.0003    |
| cobalto   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | 0.001     | < 0.001   | < 0.0002  | 0.0026    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | 0.003     | -      | 0.002     | 0.001     | 0.001     | -      | 0.002     | 0.003     | 0.0012    | 0.0092    | 0.0011    |
| hierro    | mg/L     | 0.3                                                  | -                          | 0.54      | -      | 0.52      | 0.35      | 0.19      | -      | 0.33      | 0.12      | 0.31      | 3.02      | 0.32      |
| plomo     | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0007    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | 0.002     | -      | < 0.001   | 0.001     | 0.002     | -      | 0.004     | 0.009     | 0.0063    | 0.0006    | 0.0005    |
| magnesio  | mg/L     |                                                      | -                          | 19.5      | -      | 1.71      | 9.895     | 19.3      | -      | 24.4      | 67.1      | 64.7      | 1.4       | 4.95      |
| manganeso | mg/L     | 0.1                                                  | -                          | 0.047     | -      | 0.031     | 0.0205    | 0.031     | -      | 0.13      | 0.008     | 0.035     | 0.154     | 0.018     |
| mercurio  | mg/L     | 0.001                                                | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0008    | 0.0005    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | 0.0002    | 0.001     | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | 0.04      | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | 6.3       | -      | 0.9       | 3.1       | 6         | -      | 8.1       | 20.1      | 19.5      | 0.87      | 1.73      |
| selenio   | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | 0.003     | 0.0007    | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | 9         | -      | 7.8       | 8.35      | 10.8      | -      | 7         | 10.1      | 11.1      | 7.98      | 7.99      |
| plata     | mg/L     | 0.05                                                 | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | 149       | -      | 4.81      | 72        | 144       | -      | 191       | 505       | 513       | 3.68      | 29.3      |
| estroncio | mg/L     | 4.4                                                  | -                          | 0.14      | -      | 0.036     | 0.087     | 0.15      | -      | 0.19      | 0.49      | 0.445     | 0.024     | 0.062     |
| telurio   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | 0.008     | -      | 0.007     | 0.006     | 0.001     | -      | 0.001     | 0.002     | 0.0033    | 0.029     | 0.003     |
| uranio    | mg/L     | 0.02                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | 0.0001    | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | 0.003     | -      | 0.002     | 0.002     | < 0.001   | -      | 0.001     | 0.001     | 0.0018    | 0.0095    | 0.0014    |
| zinc      | mg/L     | 5                                                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | 0.005     | < 0.005   | 0.001     | 0.007     | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.10    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W19 |        |         |         |         |        |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|---------|---------|---------|--------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | 24.2    | 24.2    | 23      | -      | -      | 25.8   | 25.9    | -      | 22.8    | 25      |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | 7.1     | 7.54    | 7.7     | -      | -      | -      | 7.74    | -      | 7.61    | 7.5     |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | 50      | -       | 60      | -      | -      | 58     | -       | -      | 50      | 203     |
| redox                                                         | mV                                      |                                                      | -                          | -      | 173     | -       | -       | -      | -      | 96     | -       | -      | 220     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | 1.69    | 9.01    | -       | -      | -      | 0.71   | -       | -      | 1.55    | 1.18    |
| General Parámetros                                            |                                         |                                                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | 7.12    | 6.61    | 6.93    | -      | -      | 7.33   | 7.72    | 7.41   | 7.29    | 7.4     |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | 48      | 52      | 56      | -      | -      | 55     | 65      | 47     | 44      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | 14      | 17      | 15      | -      | -      | 16     | 14      | 12.8   | 12      | 13.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | 14      | 15      | 15      | -      | -      | 16     | 19      | 14.1   | 12.6    | 12.9    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | 34      | 49      | 36      | -      | -      | 51     | 37      | 48     | 34      | 53      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | 1       | 8       | < 1     | -      | -      | < 1    | < 1     | 3      | < 1     | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | 16.6    | 18.3    | 18.9    | -      | -      | 15.6   | 24.5    | 18.8   | 14      | 18.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | 20.2    | 22.4    | 23.1    | -      | -      | 19.1   | 29.9    | 23     | 17.1    | 22.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | < 0.5   | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | < 0.5   | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | 0.01    | < 0.01  | < 0.01  | -      | -      | < 0.01 | 0.02    | < 0.01 | < 0.01  | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | 0.09    | 0.09    | 0.09    | -      | -      | 0.07   | < 0.05  | 0.08   | 0.12    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | 0.09    | 0.09    | 0.09    | -      | -      | 0.07   | < 0.05  | -      | -       | 0.08    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | < 0.002 | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | <0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | < 0.2   | < 0.2   | < 0.2   | -      | -      | 0.2    | < 0.2   | 0.4    | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |         |         |         |        |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | 3.76    | 4.08    | 4.92    | -      | -      | 4.5    | 4.59    | 3.55   | 3.95    | 5.14    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | < 0.05  | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | <0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | 2.59    | 2.36    | 3.22    | -      | -      | 3.52   | 3.5     | 2.66   | 2.51    | 2.62    |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W19 |        |           |          |          |        |        |          |          |          |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|-----------|----------|----------|--------|--------|----------|----------|----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08   | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | < 0.2     | < 0.2    | < 0.2    | -      | -      | 0.2      | < 0.2    | 0.4      | 0.3       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | < 20      | < 20     | < 20     | -      | -      | 20       | < 20     | <20      | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | 1.4       | 2.6      | 1.2      | -      | -      | 3.1      | < 1      | 2.6      | 1.3       | < 1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | 3         | < 2      | 2        | -      | -      | 5        | < 2      | 7        | 4         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | < 2       | < 2      | < 2      | -      | -      | < 2      | < 2      | < 2      | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | < 0.001   | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -         | -        | -        | -      | -      | -        | 5,000    | -        | 11,700    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -         | -        | -        | -      | -      | -        | 3,500    | -        | 1,000     | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | <0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | <0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |           |          |          |        |        |          |          |          |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | 0.032     | 0.055    | 0.019    | -      | -      | 0.016    | 0.016    | 0.11     | 0.048     | 0.026     |
| antimonio                            | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | 0.011     | 0.013    | 0.012    | -      | -      | 0.013    | 0.012    | 0.011    | 0.011     | 0.013     |
| berilio                              | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | < 0.01    | < 0.05   | < 0.05   | -      | -      | < 0.05   | < 0.05   | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | < 0.00004 | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.0002 | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | 3.28      | 4.25     | 3.48     | -      | -      | 3.77     | 3.35     | 3        | 2.78      | 3.23      |
| cromo                                | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | 0.0002    | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.0015   | < 0.0002  | < 0.0002  |
| cobre                                | mg/L        |                                                      | -                          | -      | 0.0005    | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | 0.001    | 0.0005    | 0.0017    |
| hierro                               | mg/L        |                                                      | -                          | -      | 0.02      | 0.12     | < 0.05   | -      | -      | < 0.05   | < 0.05   | 0.12     | 0.02      | 0.05      |
| plomo                                | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002  | < 0.0002  |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W19 |        |           |           |           |        |        |           |           |          |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|--------|-----------|-----------|-----------|--------|--------|-----------|-----------|----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | -      | 1.42      | 1.45      | 1.48      | -      | -      | 1.51      | 1.36      | 1.3      | 1.24      | 1.31      |
| manganeso              | mg/L     |                                                      | -                          | -      | 0.0028    | 0.009     | 0.003     | -      | -      | 0.003     | 0.001     | 0.0042   | 0.0023    | 0.0056    |
| mercurio               | mg/L     |                                                      | -                          | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0003   | < 0.0002  | < 0.0002  |
| fósforo                | mg/L     |                                                      | -                          | -      | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | -      | 0.63      | 0.8       | 0.7       | -      | -      | 0.8       | 0.6       | 0.73     | 0.6       | 0.74      |
| selenio                | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | -      | 6.22      | 6         | 6.3       | -      | -      | 6.5       | 5.4       | 6.74     | 6.91      | 5.99      |
| plata                  | mg/L     |                                                      | -                          | -      | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | -      | 3.54      | 3.52      | 3.7       | -      | -      | 3.9       | 3.74      | 3.44     | 3.25      | 3.58      |
| estroncio              | mg/L     |                                                      | -                          | -      | 0.027     | 0.029     | 0.03      | -      | -      | 0.029     | 0.027     | 0.027    | 0.023     | 0.028     |
| telurio                | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | -      | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | -      | 0.0009    | 0.002     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0052   | 0.0014    | 0.0004    |
| uranio                 | mg/L     |                                                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | -      | 0.0007    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0011   | 0.0005    | 0.0006    |
| zinc                   | mg/L     |                                                      | -                          | -      | < 0.001   | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | <0.001   | < 0.001   | 0.002     |
| zirconio               | mg/L     |                                                      | -                          | -      | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | <0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |        |           |           |           |        |        |           |           |          |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | -      | 0.065     | 0.17      | 0.024     | -      | -      | 0.24      | 0.022     | 0.24     | 0.077     | 0.043     |
| antimonio              | mg/L     | 0.005                                                | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0004   | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | -      | 0.012     | 0.015     | 0.012     | -      | -      | 0.012     | 0.017     | 0.013    | 0.011     | 0.014     |
| berilio                | mg/L     | 0.0146                                               | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | -      | < 0.01    | < 0.05    | < 0.05    | -      | -      | < 0.05    | < 0.05    | <0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | -      | < 0.00004 | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | -      | 3.29      | 3.63      | 3.42      | -      | -      | 3.81      | 4.5       | 3.15     | 2.92      | 3.14      |



**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W19 |        |           |           |           |        |        |           |           |          |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|-----------|-----------|-----------|--------|--------|-----------|-----------|----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| cromo     | mg/L     | 0.05                                                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto   | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | 0.0007    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0012   | 0.0004    | 0.0004    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | 0.08      | 0.35      | < 0.05    | -      | -      | < 0.05    | < 0.05    | 0.23     | 0.06      | 0.05      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | 1.41      | 1.42      | 1.48      | -      | -      | 1.54      | 1.84      | 1.5      | 1.3       | 1.24      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | 0.004     | 0.024     | 0.002     | -      | -      | 0.003     | 0.001     | 0.0041   | 0.0022    | 0.0027    |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | 0.64      | 0.8       | 0.7       | -      | -      | 0.8       | 0.7       | 0.7      | 0.64      | 0.72      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | 0.0012   | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | 6.14      | 5.9       | 6.4       | -      | -      | 6.6       | 7.3       | 7.11     | 7.17      | 5.81      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | 3.47      | 3.54      | 3.62      | -      | -      | 3.94      | 4.62      | 3.8      | 3.39      | 3.47      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | 0.026     | 0.028     | 0.03      | -      | -      | 0.03      | 0.036     | 0.027    | 0.023     | 0.028     |
| telurio   | mg/L     |                                                      | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | 0.0014    | 0.003     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.005    | 0.0016    | 0.0007    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | 0.0008    | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0012   | 0.0006    | 0.0006    |
| zinc      | mg/L     | 5                                                    | -                          | -      | < 0.001   | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | 0.001    | 0.002     | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | -      | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.17    | < 0.01    | <0.002   | < 0.002   | < 0.002   |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |        |        |          |                |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|----------|----------------|--------|
|                                                               |                                         |                                                      | Mínimo                     | Máximo | Media  | Promedio | Desv. Estándar | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |          |                |        |
| temperatura                                                   | °C                                      | ≤15                                                  | 22.8                       | 29.4   | 25.95  | 26.0375  | 2.07863        | 24     |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | 6.61                       | 8.1    | 7.305  | 7.2      | -              | 20     |
| conductividad                                                 | µS/cm                                   |                                                      | 30                         | 3,920  | 70     | 376.75   | 872.489        | 20     |
| redox                                                         | mV                                      |                                                      | 70                         | 270    | 175    | 180.333  | 60.9258        | 15     |
| turbidez                                                      | NTU                                     | 1                                                    | 0.71                       | 99     | 5.145  | 15.8725  | 25.7591        | 16     |
| General Parámetros                                            |                                         |                                                      |                            |        |        |          |                |        |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | 6.61                       | 7.75   | 7.38   | 7.11426  | -              | 25     |
| conductividad                                                 | µS/cm                                   |                                                      | 28                         | 3,560  | 65     | 490.5    | 973.633        | 25     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 7.5                        | 329    | 18     | 55.088   | 87.1637        | 25     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 9.2                        | 347    | 18     | 56.696   | 91.146         | 25     |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 19                         | 1,810  | 53     | 266.34   | 495.518        | 25     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | <1                         | 268    | 4      | 23.28    | 54.8718        | 25     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 9.1                        | 42.5   | 21.4   | 23.126   | 8.5079         | 25     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 11.1                       | 51.8   | 26.2   | 28.224   | 10.3636        | 25     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | <0.5                       | <0.5   | -      | -        | -              | 25     |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | <0.5                       | <0.5   | -      | -        | -              | 25     |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |          |                |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | <0.01                      | 0.09   | 0.01   | 0.0182   | 0.0202         | 25     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | <0.01                      | 0.14   | 0.08   | 0.0698   | 0.03869        | 25     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | <0.01                      | 0.14   | 0.07   | 0.06737  | 0.03372        | 19     |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | <0.002                     | 0.004  | <0.002 | <0.002   | 0.00072        | 25     |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | <0.2                       | 0.8    | <0.2   | 0.26     | 0.21602        | 25     |
| Aniones                                                       |                                         |                                                      |                            |        |        |          |                |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.05                       | 972    | 4.57   | 125.385  | 273.171        | 25     |
| fluoruro                                                      | mg/L                                    | 1                                                    | <0.05                      | 0.25   | <0.05  | <0.05    | 0.04835        | 25     |
| sulfato                                                       | mg/L                                    | 250                                                  | 2.02                       | 136    | 3.36   | 18.7988  | 36.0922        | 25     |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |         |        |          |                |        |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|---------|--------|----------|----------------|--------|
|                                      |             |                                                      | Mínimo                     | Máximo  | Media  | Promedio | Desv. Estándar | Conteo |
| Orgánicos                            |             |                                                      |                            |         |        |          |                |        |
| nitrógeno orgánico total             | mg/L        |                                                      | <0.2                       | 0.8     | <0.2   | 0.252    | 0.20232        | 25     |
| demanda química de oxígeno           | mg/L        |                                                      | <10                        | 297     | 10     | 35.4     | 66.0114        | 25     |
| carbono orgánico disuelto            | mg/L como C |                                                      | <1                         | 5.9     | 1.6    | 2.064    | 1.17221        | 25     |
| aceite y grasa totales               | mg/L        |                                                      | <2                         | 8       | 2      | 2.52     | 1.98158        | 25     |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | <2                         | <2      | -      | -        | -              | 25     |
| fenoles totales                      | mg/L        | 0.001                                                | <0.001                     | 0.011   | <0.001 | <0.001   | 0.00219        | 23     |
| coliformes totales                   | CFU/100mL   |                                                      | 3,100                      | 28,000  | 11,100 | 11,644.4 | 7,675.47       | 9      |
| coliformes fecales                   | CFU/100mL   |                                                      | 1,000                      | 5,300   | 2,800  | 2,883.33 | 1,152.17       | 9      |
| Especies de Cianuro                  |             |                                                      |                            |         |        |          |                |        |
| cianuro total                        | mg/L        | 0.001                                                | <0.002                     | <0.01   | -      | -        | -              | 25     |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | <0.002                     | <0.01   | -      | -        | -              | 25     |
| Metales disueltos                    |             |                                                      |                            |         |        |          |                |        |
| aluminio                             | mg/L        |                                                      | <0.005                     | 0.26    | 0.039  | 0.0702   | 0.06943        | 25     |
| antimonio                            | mg/L        |                                                      | <0.0002                    | 0.0005  | 0.0005 | 0.00035  | 0.00019        | 25     |
| arsénico                             | mg/L        |                                                      | <0.0002                    | 0.003   | 0.0005 | 0.00046  | 0.00057        | 25     |
| bario                                | mg/L        |                                                      | 0.0098                     | 0.035   | 0.017  | 0.01783  | 0.00681        | 25     |
| berilio                              | mg/L        |                                                      | <0.0002                    | <0.001  | -      | -        | -              | 25     |
| bismuto                              | mg/L        |                                                      | <0.0002                    | <0.001  | -      | -        | -              | 25     |
| boro                                 | mg/L        |                                                      | <0.01                      | 0.22    | 0.025  | 0.0384   | 0.05127        | 25     |
| cadmio                               | mg/L        |                                                      | <0.00004                   | 0.00017 | 0.0001 | 7.4E-05  | 4.4E-05        | 25     |
| calcio                               | mg/L        |                                                      | 1.84                       | 25.2    | 4.45   | 6.7334   | 6.09868        | 25     |
| cromo                                | mg/L        |                                                      | <0.0002                    | 0.0007  | 0.0005 | 0.00038  | 0.00019        | 25     |
| cobalto                              | mg/L        |                                                      | <0.0002                    | 0.0061  | 0.0005 | 0.00157  | 0.00167        | 25     |
| cobre                                | mg/L        |                                                      | <0.0005                    | 0.002   | 0.0005 | 0.0009   | 0.00056        | 25     |
| hierro                               | mg/L        |                                                      | <0.02                      | 0.65    | 0.12   | 0.1318   | 0.12627        | 25     |
| plomo                                | mg/L        |                                                      | <0.0002                    | 0.0006  | 0.0005 | 0.00036  | 0.0002         | 25     |
| litio                                | mg/L        |                                                      | <0.0002                    | 0.008   | 0.0005 | 0.00116  | 0.002          | 25     |
| magnesio                             | mg/L        |                                                      | 0.71                       | 64.5    | 1.68   | 9.2776   | 17.4911        | 25     |
| manganeso                            | mg/L        |                                                      | 0.001                      | 0.099   | 0.01   | 0.02448  | 0.02626        | 25     |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |                |               |                |                |        |
|------------------------|----------|------------------------------------------------------|----------------------------|----------------|---------------|----------------|----------------|--------|
|                        |          |                                                      | Mínimo                     | Máximo         | Media         | Promedio       | Desv. Estándar | Conteo |
| mercurio               | mg/L     |                                                      | <0.00002                   | <0.00002       | -             | -              | -              | 25     |
| molibdeno              | ug/L     |                                                      | <0.0001                    | 0.0006         | 0.00025       | 0.00021        | 0.00015        | 25     |
| níquel                 | mg/L     |                                                      | <0.0002                    | 0.002          | 0.0005        | 0.00051        | 0.00036        | 25     |
| fósforo                | mg/L     |                                                      | <0.03                      | <0.15          | -             | -              | -              | 25     |
| potasio                | mg/L     |                                                      | 0.56                       | 19.2           | 0.8           | 3.0776         | 5.23126        | 25     |
| selenio                | mg/L     |                                                      | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| sílice                 | mg/L     |                                                      | 4.64                       | 11.3           | 7             | 7.384          | 1.65612        | 25     |
| plata                  | mg/L     |                                                      | <0.00005                   | <0.00025       | -             | -              | -              | 25     |
| sodio                  | mg/L     |                                                      | 2.02                       | 519            | 3.83          | 67.6708        | 145.132        | 25     |
| estroncio              | mg/L     |                                                      | 0.014                      | 0.437          | 0.035         | 0.0815         | 0.11304        | 25     |
| telurio                | mg/L     |                                                      | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| talio                  | mg/L     |                                                      | <0.00002                   | <0.0001        | -             | -              | -              | 25     |
| torio                  | mg/L     |                                                      | <0.0001                    | <0.0005        | -             | -              | -              | 25     |
| estaño                 | mg/L     |                                                      | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| titanio                | mg/L     |                                                      | <0.0004                    | 0.0071         | 0.00105       | 0.00211        | 0.00199        | 25     |
| uranio                 | mg/L     |                                                      | <0.0001                    | <0.0005        | -             | -              | -              | 25     |
| vanadio                | mg/L     |                                                      | <0.0005                    | 0.002          | 0.0009        | 0.00093        | 0.00049        | 25     |
| zinc                   | mg/L     |                                                      | <0.001                     | 0.005          | 0.0025        | 0.00206        | 0.00101        | 25     |
| zirconio               | mg/L     |                                                      | <0.002                     | <0.01          | -             | -              | -              | 25     |
| <b>Metales Totales</b> |          |                                                      |                            |                |               |                |                |        |
| aluminio               | mg/L     | 0.2                                                  | <b>0.022</b>               | <b>2.41</b>    | <b>0.14</b>   | <b>0.37985</b> | 0.58485        | 24     |
| antimonio              | mg/L     | 0.005                                                | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| arsénico               | mg/L     | 0.01                                                 | <0.0002                    | 0.002          | 0.0005        | 0.00044        | 0.00038        | 25     |
| bario                  | mg/L     | 0.7                                                  | 0.011                      | 0.049          | 0.021         | 0.02186        | 0.00939        | 25     |
| berilio                | mg/L     | 0.0146                                               | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| bismuto                | mg/L     |                                                      | <0.0002                    | <0.001         | -             | -              | -              | 25     |
| boro                   | mg/L     | 5                                                    | <0.01                      | 0.27           | 0.025         | 0.0408         | 0.06067        | 25     |
| cadmio                 | mg/L     | 0.003                                                | <0.00004                   | <b>0.00011</b> | <b>0.0001</b> | <b>7.2E-05</b> | 4E-05          | 25     |
| calcio                 | mg/L     |                                                      | 2.13                       | 28.3           | 4.37          | 6.9142         | 6.57789        | 25     |
| cromo                  | mg/L     | 0.05                                                 | <0.0002                    | 0.0014         | 0.0005        | 0.00042        | 0.00027        | 25     |

**Tabla 15**      **Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica en el Área de Estudio del Enfoque Ecosistémico (AEEE)**  
**(continuación)**

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |         |          |                |        |
|-----------|----------|------------------------------------------------------|----------------------------|----------|---------|----------|----------------|--------|
|           |          |                                                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Estándar | Conteo |
| cobalto   | mg/L     |                                                      | <0.0002                    | 0.0026   | 0.0005  | 0.00053  | 0.00052        | 25     |
| cobre     | mg/L     | 1                                                    | <0.0004                    | 0.0092   | 0.001   | 0.00178  | 0.00194        | 25     |
| hierro    | mg/L     | 0.3                                                  | <0.05                      | 3.02     | 0.31    | 0.4374   | 0.61642        | 25     |
| plomo     | mg/L     | 0.01                                                 | <0.0002                    | 0.0007   | 0.0005  | 0.00037  | 0.0002         | 25     |
| litio     | mg/L     | 0.0146                                               | <0.0002                    | 0.009    | 0.0005  | 0.00126  | 0.00214        | 25     |
| magnesio  | mg/L     |                                                      | 0.93                       | 67.1     | 1.72    | 9.5532   | 18.1731        | 25     |
| manganeso | mg/L     | 0.1                                                  | 0.001                      | 0.154    | 0.0205  | 0.03169  | 0.03973        | 25     |
| mercurio  | mg/L     | 0.001                                                | <0.00002                   | <0.00002 | -       | -        | -              | 25     |
| molibdeno | mg/L     | 0.07                                                 | <0.0001                    | 0.0008   | 0.00025 | 0.00021  | 0.00017        | 25     |
| níquel    | mg/L     | 0.02                                                 | <0.0002                    | 0.001    | 0.0005  | 0.00039  | 0.00022        | 25     |
| fósforo   | mg/L     | 0.000146                                             | <0.03                      | 0.075    | 0.075   | 0.052    | 0.02915        | 25     |
| potasio   | mg/L     |                                                      | 0.64                       | 20.1     | 0.87    | 3.1462   | 5.40636        | 25     |
| selenio   | mg/L     | 0.01                                                 | <0.0002                    | 0.003    | 0.0005  | 0.00065  | 0.00071        | 25     |
| sílice    | mg/L     |                                                      | 5.54                       | 11.1     | 7.3     | 7.665    | 1.52593        | 25     |
| plata     | mg/L     | 0.05                                                 | <0.00005                   | <0.00025 | -       | -        | -              | 25     |
| sodio     | mg/L     | ≤ 200                                                | 2.04                       | 513      | 3.94    | 66.831   | 143.215        | 25     |
| estroncio | mg/L     | 4.4                                                  | 0.018                      | 0.49     | 0.036   | 0.08596  | 0.12306        | 25     |
| telurio   | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 25     |
| talio     | mg/L     |                                                      | <0.00001                   | <0.0001  | -       | -        | -              | 25     |
| torio     | mg/L     |                                                      | <0.0001                    | <0.0005  | -       | -        | -              | 25     |
| estaño    | mg/L     | 4.4                                                  | <0.0002                    | <0.001   | -       | -        | -              | 25     |
| titanio   | mg/L     |                                                      | <0.0007                    | 0.029    | 0.003   | 0.00489  | 0.00633        | 25     |
| uranio    | mg/L     | 0.02                                                 | <0.0001                    | 0.00025  | 0.00025 | 0.00017  | 9.8E-05        | 25     |
| vanadio   | mg/L     |                                                      | <0.0006                    | 0.0095   | 0.001   | 0.00173  | 0.00187        | 25     |
| zinc      | mg/L     | 5                                                    | <0.001                     | 0.015    | 0.0025  | 0.00278  | 0.00291        | 25     |
| zirconio  | mg/L     |                                                      | <0.002                     | <0.17    | -       | -        | -              | 25     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la salud.

Tabla 16 Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W1 |         |         |         |         |        |         |         |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08  | Jun-08  | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 24.8                      | 27      | 24      | 24.6    | -       | -      | 25      | 25.7    | 26.2    | 25.7    | 24.3    | 24.1    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 5.7     | 6.78    | 7.05    | -       | -      | 6.62    | -       | 6.91    | 7.3     | 6.74    | 6.75    |
| conductividad                                                 | µS/cm                                   |                                                      | 40                        | 40      | 60      | -       | -       | -      | 30      | 43      | -       | 50      | 40      | 157     |
| redox                                                         | mV                                      |                                                      | 225                       | 190     | 150     | -       | -       | -      | -       | 91      | -       | 327     | 231     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 10.87   | 4.87    | -       | -      | 24.4    | 0.36    | -       | 1.73    | 52.5    | 3.94    |
| General Parámetros                                            |                                         |                                                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 6.94                      | 7.07    | 6.97    | 6.33    | 7.06    | -      | 6.57    | 7.06    | 7.15    | 7.16    | 6.44    | 7.04    |
| conductividad                                                 | µS/cm                                   |                                                      | 42                        | 44      | 34      | 42      | 50      | -      | 29      | 44      | 44      | 46      | 19      | 40      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 11.5                      | 13      | 8.7     | 10      | 10      | -      | 7.3     | 11      | 11.8    | 11.7    | 4.2     | 9.9     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 11.7                      | 12      | 8.5     | 10      | 10      | -      | 6.9     | 11      | 12      | 12.3    | 5.4     | 9.5     |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 43                        | 39      | 17      | 40      | 48      | -      | 46      | 31      | 43      | 33      | 10      | 53      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | < 1                       | < 1     | 11      | 2       | 1       | -      | 189     | < 1     | < 1     | 1       | 248     | 5       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 11.4                      | 10.7    | 9.4     | 10.5    | 12.9    | -      | 6.32    | 9.5     | 11.9    | 13.3    | 5       | 11.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 14                        | 13      | 11.5    | 12.8    | 15.8    | -      | 7.71    | 11.6    | 14.5    | 16.2    | 6.1     | 14.1    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | 0.01    | < 0.01  | < 0.01  | < 0.01  | 0.01    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.08                      | 0.13    | 0.23    | 0.14    | 0.14    | -      | 0.15    | 0.11    | 0.1     | 0.1     | 0.11    | 0.13    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.08                      | 0.13    | 0.23    | 0.14    | 0.14    | -      | 0.15    | 0.11    | 0.1     | -       | -       | 0.13    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | -      | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                     | < 0.2   | < 0.2   | < 0.2   | < 0.2   | -      | 0.3     | 0.4     | < 0.2   | 0.2     | 0.3     | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |         |         |         |        |         |         |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 0.7                       | 3.09    | 2.77    | 3.32    | 3.41    | -      | 2.96    | 3.25    | 3.4     | 3.36    | 1.7     | 4.22    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | -      | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 0.89                      | 4.18    | 3.73    | 4.51    | 4.36    | -      | 3.09    | 5.66    | 5.18    | 5.48    | 2.02    | 3.5     |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W1 |          |           |          |          |        |           |          |           |          |           |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|--------|-----------|----------|-----------|----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08    | Jun-08   | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |        |           |          |           |          |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                     | < 0.2    | < 0.2     | < 0.2    | < 0.2    | -      | 0.3       | 0.4      | < 0.2     | 0.2      | 0.3       | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                      | < 20     | 23        | < 20     | 22       | -      | 20        | 26       | < 20      | 26       | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | < 1                       | 1.2      | -         | < 1      | 1.4      | -      | 2.6       | 1.5      | < 1       | 1.4      | 2         | 1.2       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | 2        | -      | 2         | 3        | < 2       | 6        | -         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | -      | < 2       | < 2      | < 2       | < 2      | -         | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                   | 0.004    | < 0.001   | < 0.001  | < 0.001  | -      | 0.005     | < 0.001  | < 0.001   | < 0.001  | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -      | -         | 1300     | 800       | 5550     | 5200      | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -      | -         | 1000     | 100       | 300      | 1500      | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |        |           |          |           |          |           |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | < 0.01    | < 0.01   | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | < 0.01    | < 0.01   | < 0.01    | < 0.002  | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |        |           |          |           |          |           |           |
| aluminio                             | mg/L        |                                                      | 0.008                     | 0.013    | 0.063     | 0.013    | 0.014    | -      | 0.15      | 0.008    | 0.004     | 0.008    | 0.23      | 0.023     |
| antimonio                            | mg/L        |                                                      | 0.0003                    | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | 0.0003    | <0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.011                     | 0.01     | 0.0074    | 0.009    | 0.009    | -      | 0.0057    | 0.009    | 0.01      | 0.01     | 0.0039    | 0.011     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | <0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | < 0.01    | < 0.05   | 0.08     | -      | 0.01      | < 0.05   | < 0.01    | <0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | -      | < 0.00004 | < 0.0002 | < 0.00004 | <0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | 2.68                      | 2.74     | 1.78      | 2.3      | 2.18     | -      | 1.52      | 2.36     | 2.5       | 2.62     | 0.83      | 2.13      |
| cromo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | <0.0002  | 0.0002    | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0068                    | < 0.001  | 0.0009    | 0.004    | < 0.001  | -      | 0.0011    | < 0.001  | 0.0004    | <0.0002  | 0.0036    | 0.0024    |
| cobre                                | mg/L        |                                                      | 0.0056                    | 0.006    | 0.0075    | 0.006    | 0.007    | -      | 0.02      | 0.005    | 0.0064    | 0.0024   | 0.014     | 0.012     |
| hierro                               | mg/L        |                                                      | 0.05                      | 0.07     | 0.08      | 0.07     | 0.06     | -      | 0.18      | < 0.05   | 0.06      | 0.03     | 0.23      | 0.09      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | <0.0002  | 0.0008    | < 0.0002  |
| litio                                | mg/L        |                                                      | 0.0002                    | < 0.001  | 0.0002    | < 0.001  | < 0.001  | -      | < 0.0002  | 0.001    | 0.0002    | 0.0002   | < 0.0002  | 0.0003    |



Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W1 |              |             |              |              |        |             |             |              |             |             |              |
|------------------------|----------|------------------------------------------------------|---------------------------|--------------|-------------|--------------|--------------|--------|-------------|-------------|--------------|-------------|-------------|--------------|
|                        |          |                                                      | Sept-07                   | Oct-07       | Nov-07      | Dic-07       | Ene-08       | Mar-08 | May-08      | Jun-08      | Sept-08      | Oct-08      | Nov-08      | Feb-09       |
| magnesio               | mg/L     |                                                      | 1.17                      | 1.53         | 1.04        | 1.15         | 1.22         | -      | 0.84        | 1.26        | 1.35         | 1.26        | 0.51        | 1.12         |
| manganeso              | mg/L     |                                                      | 0.049                     | 0.036        | 0.032       | 0.034        | 0.036        | -      | 0.032       | 0.028       | 0.034        | <0.0002     | 0.031       | 0.043        |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002    | < 0.00002   | < 0.00002    | < 0.00002    | -      | < 0.00002   | < 0.00002   | <0.00002     | <0.00002    | < 0.00002   | < 0.00002    |
| molibdeno              | ug/L     |                                                      | 0.0005                    | 0.0005       | 0.0003      | < 0.0005     | 0.0005       | -      | 0.0004      | < 0.0005    | 0.0004       | 0.0004      | 0.0003      | 0.0003       |
| níquel                 | mg/L     |                                                      | 0.0009                    | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | 0.0002      | < 0.001     | < 0.0002     | <0.0002     | 0.0006      | 0.0004       |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15       | < 0.03      | < 0.15       | < 0.15       | -      | < 0.03      | < 0.15      | < 0.03       | <0.03       | < 0.03      | < 0.03       |
| potasio                | mg/L     |                                                      | 0.66                      | 0.6          | 0.55        | 0.6          | 0.5          | -      | 0.64        | 0.6         | 0.58         | 0.58        | 0.41        | 0.55         |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.0002     | <0.0002     | < 0.0002    | < 0.0002     |
| sílice                 | mg/L     |                                                      | 6.31                      | 7.2          | 5.1         | 5.6          | 5.6          | -      | 3.54        | 5.8         | 6.27         | 6.71        | 3.1         | 4.64         |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025    | < 0.00005   | < 0.00025    | < 0.00025    | -      | < 0.00005   | < 0.00025   | < 0.00005    | <0.00005    | < 0.00005   | < 0.00005    |
| sodio                  | mg/L     |                                                      | 2.89                      | 3.37         | 2.46        | 2.82         | 2.96         | -      | 2.49        | 3.05        | 3.18         | 3.07        | 1.44        | 2.77         |
| estroncio              | mg/L     |                                                      | 0.022                     | 0.022        | 0.015       | 0.018        | 0.019        | -      | 0.014       | 0.019       | 0.021        | 0.02        | 0.0072      | 0.018        |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.0002     | <0.0002     | < 0.0002    | < 0.0002     |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001     | < 0.00002   | < 0.0001     | < 0.0001     | -      | < 0.00002   | < 0.0001    | < 0.00002    | <0.00002    | < 0.00002   | < 0.00002    |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005     | < 0.0001    | < 0.0005     | < 0.0005     | -      | < 0.0001    | < 0.0005    | < 0.0001     | <0.0001     | < 0.0001    | < 0.0001     |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.0002     | <0.0002     | < 0.0002    | < 0.0002     |
| titanio                | mg/L     |                                                      | 0.0004                    | < 0.001      | 0.0012      | < 0.001      | < 0.001      | -      | 0.0031      | < 0.001     | 0.0003       | 0.0003      | 0.0049      | 0.0005       |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005     | < 0.0001    | < 0.0005     | < 0.0005     | -      | < 0.0001    | < 0.0005    | < 0.0001     | <0.0001     | < 0.0001    | < 0.0001     |
| vanadio                | mg/L     |                                                      | 0.0003                    | < 0.001      | 0.0004      | < 0.001      | < 0.001      | -      | 0.0006      | < 0.001     | < 0.0002     | <0.0002     | 0.0007      | 0.0002       |
| zinc                   | mg/L     |                                                      | 0.007                     | < 0.005      | 0.005       | 0.005        | 0.006        | -      | 0.007       | < 0.005     | 0.006        | 0.002       | 0.004       | 0.007        |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01       | < 0.002     | < 0.01       | < 0.01       | -      | < 0.002     | < 0.01      | < 0.002      | <0.002      | < 0.002     | < 0.002      |
| <b>Metales Totales</b> |          |                                                      |                           |              |             |              |              |        |             |             |              |             |             |              |
| aluminio               | mg/L     | 0.2                                                  | <b>0.028</b>              | <b>0.021</b> | <b>0.15</b> | <b>0.024</b> | <b>0.041</b> | -      | <b>0.69</b> | <b>0.22</b> | <b>0.012</b> | <b>0.11</b> | <b>1.63</b> | <b>0.064</b> |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.001      | <0.0002     | < 0.0002    | < 0.0002     |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.001      | <0.0002     | < 0.0002    | < 0.0002     |
| bario                  | mg/L     | 0.7                                                  | 0.01                      | 0.01         | 0.0086      | 0.01         | 0.009        | -      | 0.016       | 0.01        | 0.011        | 0.013       | 0.02        | 0.011        |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.001      | <0.0002     | < 0.0002    | < 0.0002     |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.001      | <0.0002     | < 0.0002    | < 0.0002     |
| boro                   | mg/L     | 5                                                    | < 0.01                    | < 0.05       | < 0.01      | < 0.05       | 0.08         | -      | 0.01        | < 0.05      | < 0.05       | 0.02        | < 0.01      | < 0.01       |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002     | < 0.00004   | < 0.0002     | < 0.0002     | -      | < 0.00004   | < 0.0002    | < 0.0002     | <0.00004    | < 0.00004   | < 0.00004    |
| calcio                 | mg/L     |                                                      | 2.37                      | 2.56         | 1.7         | 2.11         | 2.12         | -      | 1.4         | 2.43        | 2.47         | 2.63        | 0.99        | 2.01         |
| cromo                  | mg/L     | 0.05                                                 | 0.0002                    | < 0.001      | < 0.0002    | < 0.001      | < 0.001      | -      | < 0.0002    | < 0.001     | < 0.001      | <0.0002     | 0.0008      | < 0.0002     |



Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W1 |           |           |           |           |        |           |           |           |          |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | 0.0015    | < 0.001   | < 0.001   | 0.0004   | 0.0028    | 0.0002    |
| cobre     | mg/L     | 1                                                    | 0.0091                    | 0.008     | 0.011     | 0.007     | 0.008     | -      | 0.075     | 0.007     | 0.007     | 0.015    | 0.101     | 0.014     |
| hierro    | mg/L     | 0.3                                                  | 0.11                      | 0.14      | 0.18      | 0.1       | 0.1       | -      | 1.36      | 0.1       | 0.08      | 0.35     | 1.85      | 0.16      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | 0.0011    | < 0.001   | < 0.001   | <0.0002  | 0.002     | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | 0.0003    | 0.001     | < 0.001   | 0.0005   | 0.0005    | 0.0003    |
| magnesio  | mg/L     |                                                      | 1.4                       | 1.42      | 1.04      | 1.13      | 1.21      | -      | 0.83      | 1.29      | 1.34      | 1.39     | 0.72      | 1.09      |
| manganeso | mg/L     | 0.1                                                  | 0.028                     | 0.028     | 0.037     | 0.027     | 0.035     | -      | 0.124     | 0.029     | 0.034     | 0.05     | 0.192     | 0.039     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0005                    | < 0.0005  | 0.0003    | < 0.0005  | < 0.0005  | -      | 0.0006    | < 0.0005  | < 0.0005  | 0.0005   | 0.0005    | 0.0002    |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | 0.0002    | < 0.001   | < 0.001   | <0.0002  | 0.0004    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.58                      | 0.6       | 0.55      | 0.6       | 0.5       | -      | 0.66      | 0.6       | 0.6       | 0.59     | 0.56      | 0.5       |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | 0.0005   | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 6.42                      | 6.7       | 4.88      | 5.2       | 5.4       | -      | 3.41      | 6         | 6.1       | 7.8      | 3.94      | 4.41      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | 0.00006   | < 0.00025 | < 0.00025 | 0.00006  | 0.0013    | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 3.18                      | 3.11      | 2.46      | 3.13      | 2.74      | -      | 2.33      | 3.03      | 3.45      | 3.54     | 1.47      | 2.62      |
| estroncio | mg/L     | 4.4                                                  | 0.02                      | 0.021     | 0.015     | 0.017     | 0.018     | -      | 0.014     | 0.02      | 0.021     | 0.026    | 0.0098    | 0.018     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.00001 | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0007                    | < 0.001   | 0.0057    | < 0.001   | < 0.001   | -      | 0.004     | < 0.001   | < 0.001   | 0.0025   | 0.0096    | 0.0006    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0004                    | < 0.001   | 0.0005    | < 0.001   | < 0.001   | -      | 0.0023    | < 0.001   | < 0.001   | 0.0006   | 0.0054    | 0.0003    |
| zinc      | mg/L     | 5                                                    | 0.004                     | < 0.005   | 0.004     | < 0.005   | < 0.005   | -      | 0.009     | 0.008     | < 0.005   | 0.005    | 0.013     | 0.005     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.01    | < 0.01    | <0.002   | < 0.002   | < 0.002   |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W2 |         |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 25.6                      | 26.2    | -      | -      | -      | -      | -      | 25.7   | 28.7    | 27.6    | 23.7    | 24.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 5.7     | -      | -      | -      | -      | -      | -      | 7.28    | 7.6     | 6.94    | 6.78    |
| conductividad                                                 | μS/cm                                   |                                                      | 40                        | 60      | -      | -      | -      | -      | -      | 43     | -       | 50      | 20      | 172     |
| redox                                                         | mV                                      |                                                      | 240                       | 190     | -      | -      | -      | -      | -      | 74     | -       | 304     | 235     | 40      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | -      | -      | -      | -      | -      | 2.69   | -       | 7.61    | 19.4    | 8.84    |
| General Parámetros                                            |                                         |                                                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.06                      | 7.21    | -      | -      | -      | -      | -      | 7.12   | 7.26    | 7.3     | 7.06    | 7.07    |
| conductividad                                                 | μS/cm                                   |                                                      | 42                        | 45      | -      | -      | -      | -      | -      | 44     | 42      | 47      | 29      | 38.5    |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 13.3                      | 14      | -      | -      | -      | -      | -      | 11     | 13      | 13.9    | 4.9     | 9.2     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 12.4                      | 13      | -      | -      | -      | -      | -      | 12     | 12      | 13.4    | 5.3     | 9.5     |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | 51                        | 47      | -      | -      | -      | -      | -      | 35     | 37      | 45      | < 10    | 19      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 10                        | 4       | -      | -      | -      | -      | -      | 4      | < 1     | 8       | 30      | 10.5    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 13.8                      | 13.7    | -      | -      | -      | -      | -      | 11.4   | 13.5    | 16.8    | 10.9    | 11.65   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 16.8                      | 16.7    | -      | -      | -      | -      | -      | 13.9   | 16.5    | 20.4    | 13.3    | 14.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | -      | -      | -      | -      | -      | < 0.01 | 0.02    | < 0.01  | < 0.01  | 0.03    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.1                       | 0.08    | -      | -      | -      | -      | -      | 0.07   | 0.1     | 0.08    | 0.12    | 0.085   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.1                       | 0.08    | -      | -      | -      | -      | -      | 0.07   | 0.1     | -       | -       | 0.085   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | -      | -      | -      | -      | -      | <0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                     | < 0.2   | -      | -      | -      | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.98                      | 3.09    | -      | -      | -      | -      | -      | 3.22   | 3.15    | 3.33    | 1.84    | 4.59    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 3.63                      | 2.92    | -      | -      | -      | -      | -      | 4.14   | 3.6     | 4.09    | 1.89    | 2.63    |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W2 |          |        |        |        |        |        |          |          |          |          |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|--------|--------|--------|--------|--------|----------|----------|----------|----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08   | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |        |        |        |        |        |          |          |          |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                     | < 0.2    | -      | -      | -      | -      | -      | < 0.2    | < 0.2    | < 0.2    | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | 21                        | < 20     | -      | -      | -      | -      | -      | 26       | < 20     | 38       | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 1.3                       | 1.5      | -      | -      | -      | -      | -      | 2.1      | 1.4      | 1.6      | 2.2      | 1.5       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | < 2      | -      | -      | -      | -      | -      | 4        | < 2      | 6        | < 2      | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | -      | -      | -      | -      | -      | < 2      | < 2      | < 2      | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                   | 0.013    | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.001  | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -      | 2,000    | 3,400    | 900      | 5,800    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -      | 900      | 1,600    | 100      | 2,000    | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |        |        |        |        |        |          |          |          |          |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002  | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002  | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |        |        |        |        |        |          |          |          |          |           |
| aluminio                             | mg/L        |                                                      | 0.012                     | 0.015    | -      | -      | -      | -      | -      | 0.005    | 0.018    | 0.005    | 0.12     | 0.025     |
| antimonio                            | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | 0.0002   | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.01                      | 0.009    | -      | -      | -      | -      | -      | 0.008    | 0.009    | 0.0084   | 0.0052   | 0.01      |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | <0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | <0.00004 | 0.00018  | < 0.00004 |
| calcio                               | mg/L        |                                                      | 3                         | 3.08     | -      | -      | -      | -      | -      | 2.5      | 2.81     | 3.15     | 1.01     | 2.02      |
| cromo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | 0.0064   | 0.00135   |
| cobre                                | mg/L        |                                                      | 0.0022                    | 0.003    | -      | -      | -      | -      | -      | 0.002    | 0.003    | 0.0031   | 0.0078   | 0.0071    |
| hierro                               | mg/L        |                                                      | 0.06                      | 0.1      | -      | -      | -      | -      | -      | < 0.05   | 0.1      | 0.07     | 0.13     | 0.075     |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | <0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | -      | 0.001    | < 0.001  | <0.0002  | < 0.0002 | 0.0003    |
| magnesio                             | mg/L        |                                                      | 1.42                      | 1.5      | -      | -      | -      | -      | -      | 1.26     | 1.41     | 1.46     | 0.57     | 1.015     |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W2 |           |        |        |        |        |        |           |           |          |           |           |
|------------------------|----------|------------------------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|----------|-----------|-----------|
|                        |          |                                                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08   | Nov-08    | Feb-09    |
| manganeso              | mg/L     |                                                      | 0.019                     | 0.02      | -      | -      | -      | -      | -      | 0.018     | 0.029     | <0.0002  | 0.03      | 0.0265    |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | <0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | 0.0003                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003   | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | 0.001     | 0.00025   |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | <0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | 0.48                      | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5       | 0.47     | 0.33      | 0.43      |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | 6.6                       | 7         | -      | -      | -      | -      | -      | 5.6       | 6.1       | 6.94     | 3.19      | 3.86      |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | <0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | 3.06                      | 3.28      | -      | -      | -      | -      | -      | 2.86      | 3.15      | 3.27     | 1.55      | 2.66      |
| estroncio              | mg/L     |                                                      | 0.022                     | 0.023     | -      | -      | -      | -      | -      | 0.019     | 0.022     | 0.023    | 0.0083    | 0.017     |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | <0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | 0.0005                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | 0.001     | 0.0003   | 0.0026    | 0.0009    |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | <0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | 0.0006                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0007   | 0.0005    | 0.0003    |
| zinc                   | mg/L     |                                                      | 0.003                     | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | <0.001   | 0.005     | 0.005     |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | <0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                           |           |        |        |        |        |        |           |           |          |           |           |
| aluminio               | mg/L     | 0.2                                                  | 0.14                      | 0.067     | -      | -      | -      | -      | -      | 0.58      | 0.039     | 0.17     | 0.27      | 0.087     |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0003   | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | 0.01                      | 0.01      | -      | -      | -      | -      | -      | 0.01      | 0.012     | 0.011    | 0.007     | 0.0115    |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | < 0.01                    | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | 0.01     | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | <0.00004 | 0.00017   | < 0.00004 |
| calcio                 | mg/L     |                                                      | 2.47                      | 2.82      | -      | -      | -      | -      | -      | 2.6       | 2.64      | 2.96     | 1.08      | 2.055     |
| cromo                  | mg/L     | 0.05                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | <0.0002  | < 0.0002  | < 0.0002  |
| cobalto                | mg/L     |                                                      | 0.0002                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0002   | < 0.0002  | 0.0002    |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W2 |           |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | 0.0077                    | 0.01      | -      | -      | -      | -      | -      | 0.005     | 0.005     | 0.014     | 0.01      | 0.0098    |
| hierro    | mg/L     | 0.3                                                  | 0.26                      | 0.3       | -      | -      | -      | -      | -      | 0.21      | 0.16      | 0.56      | 0.24      | 0.215     |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0002    | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                    | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001   | 0.0005    | 0.0002    | 0.00025   |
| magnesio  | mg/L     |                                                      | 1.52                      | 1.42      | -      | -      | -      | -      | -      | 1.3       | 1.36      | 1.46      | 0.63      | 1.065     |
| manganeso | mg/L     | 0.1                                                  | 0.023                     | 0.022     | -      | -      | -      | -      | -      | 0.022     | 0.014     | 0.023     | 0.024     | 0.0335    |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0003                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.45                      | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5       | 0.46      | 0.37      | 0.43      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | 0.002     | 0.0006    | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 6.43                      | 6.5       | -      | -      | -      | -      | -      | 5.5       | 5.6       | 7.72      | 3.54      | 3.93      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 3.25                      | 3.01      | -      | -      | -      | -      | -      | 2.94      | 3.2       | 3.43      | 1.59      | 2.725     |
| estroncio | mg/L     | 4.4                                                  | 0.02                      | 0.022     | -      | -      | -      | -      | -      | 0.02      | 0.021     | 0.027     | 0.0094    | 0.018     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0022                    | < 0.001   | -      | -      | -      | -      | -      | 0.002     | < 0.001   | 0.0037    | 0.0025    | 0.001     |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0012                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.002     | 0.0009    | 0.0006    |
| zinc      | mg/L     | 5                                                    | 0.003                     | < 0.005   | -      | -      | -      | -      | -      | 0.006     | 0.005     | 0.003     | 0.003     | 0.004     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.12    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W10 |         |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | 26.2    | -      | -      | -      | -      | -      | 25.5   | 30.6    | 27.1    | 22.7    | 24      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | 6.1     | -      | -      | -      | -      | -      | -      | 7.45    | 7.6     | 7.04    | 7.13    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | 40      | -      | -      | -      | -      | -      | 41     | -       | 70      | 20      | 197     |
| redox                                                         | mV                                      |                                                      | -                          | 180     | -      | -      | -      | -      | -      | 114    | -       | 315     | 236     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -      | -      | -      | -      | -      | 6.55   | -       | 2       | 13.9    | 2.2     |
| General Parámetros                                            |                                         |                                                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | 7.18    | -      | -      | -      | -      | -      | 7.14   | 7.41    | 7.39    | 6.6     | 7.29    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | 39      | -      | -      | -      | -      | -      | 40     | 44      | 48      | 20      | 41      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 12      | -      | -      | -      | -      | -      | 11     | 13      | 13.1    | 4.9     | 10.9    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 13      | -      | -      | -      | -      | -      | 12     | 13      | 15.4    | 5.2     | 10.5    |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | -                          | 16      | -      | -      | -      | -      | -      | 29     | 41      | 35      | < 10    | 52      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | 1       | -      | -      | -      | -      | -      | 3      | 1       | 1       | 22      | 1       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | 12.9    | -      | -      | -      | -      | -      | 12     | 15.7    | 20.3    | 6.3     | 15.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | 15.7    | -      | -      | -      | -      | -      | 15.6   | 19.1    | 24.7    | 7.7     | 19.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | < 0.01  | -      | -      | -      | -      | -      | 0.01   | 0.02    | < 0.01  | 0.02    | < 0.01  |
| nitrate y nitrite (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | 0.13    | -      | -      | -      | -      | -      | 0.07   | 0.05    | 0.06    | 0.1     | 0.03    |
| nitrate (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | 0.13    | -      | -      | -      | -      | -      | 0.07   | 0.05    | -       | -       | 0.03    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | < 0.002 | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | 0.3     | -      | -      | -      | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | 2.86    | -      | -      | -      | -      | -      | 3.26   | 3.26    | 3.3     | 1.84    | 3.85    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | 2.44    | -      | -      | -      | -      | -      | 2.72   | 2.89    | 3.22    | 1.57    | 2.44    |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W10 |          |        |        |        |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|--------|--------|--------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |        |        |        |        |        |          |          |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | 0.3      | -      | -      | -      | -      | -      | < 0.2    | < 0.2    | < 0.2     | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | < 20     | -      | -      | -      | -      | -      | 28       | < 20     | 120       | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | 2.2      | -      | -      | -      | -      | -      | < 1      | 1.3      | 1.3       | 3        | 1         |
| aceite y grasa totales               | mg/L        |                                                      | -                          | < 2      | -      | -      | -      | -      | -      | 4        | < 2      | 6         | 2        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | < 2      | -      | -      | -      | -      | -      | < 2      | < 2      | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | 0.01     | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -      | -      | -      | -      | -      | 2,100    | 5,400    | 5,500     | 13,700   | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -      | -      | -      | -      | -      | 1,100    | 700      | 1,600     | 2,600    | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |        |        |        |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |        |        |        |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      | -                          | 0.038    | -      | -      | -      | -      | -      | 0.014    | 0.018    | 0.006     | 0.11     | 0.012     |
| antimonio                            | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | 0.0002    |
| arsénico                             | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | 0.011    | -      | -      | -      | -      | -      | 0.011    | 0.011    | 0.011     | 0.0059   | 0.012     |
| berilio                              | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | < 0.05   | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | < 0.0002 | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00019  | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | 2.72     | -      | -      | -      | -      | -      | 2.43     | 3.01     | 3.06      | 1.04     | 2.51      |
| cromo                                | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | 0.002    | -      | -      | -      | -      | -      | < 0.001  | 0.001    | 0.0002    | 0.0023   | 0.0071    |
| cobre                                | mg/L        |                                                      | -                          | 0.003    | -      | -      | -      | -      | -      | 0.002    | 0.002    | 0.0016    | 0.0052   | 0.0027    |
| hierro                               | mg/L        |                                                      | -                          | 0.16     | -      | -      | -      | -      | -      | 0.07     | 0.14     | 0.17      | 0.13     | 0.12      |
| plomo                                | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | < 0.001  | -      | -      | -      | -      | -      | 0.001    | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| magnesio                             | mg/L        |                                                      | -                          | 1.27     | -      | -      | -      | -      | -      | 1.16     | 1.39     | 1.31      | 0.56     | 1.12      |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W10 |           |        |        |        |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| manganeso              | mg/L     |                                                      | -                          | 0.014     | -      | -      | -      | -      | -      | 0.011     | 0.018     | 0.0009    | 0.022     | 0.031     |
| mercurio               | mg/L     |                                                      | -                          | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.001     |
| fósforo                | mg/L     |                                                      | -                          | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.5       | 0.49      | 0.34      | 0.4       |
| selenio                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | 6         | -      | -      | -      | -      | -      | 5.1       | 6.4       | 6.64      | 2.98      | 5.15      |
| plata                  | mg/L     |                                                      | -                          | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | 2.99      | -      | -      | -      | -      | -      | 3.01      | 3.4       | 3.24      | 1.6       | 2.91      |
| estroncio              | mg/L     |                                                      | -                          | 0.022     | -      | -      | -      | -      | -      | 0.018     | 0.023     | 0.026     | 0.0086    | 0.02      |
| telurio                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | < 0.0001  | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0005    | 0.0031    | 0.0004    |
| uranio                 | mg/L     |                                                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0008    | 0.0005    |
| zinc                   | mg/L     |                                                      | -                          | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.003     | 0.004     |
| zirconio               | mg/L     |                                                      | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |        |        |        |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | 0.078     | -      | -      | -      | -      | -      | 0.59      | 0.045     | 0.032     | 0.4       | 0.031     |
| antimonio              | mg/L     | 0.005                                                | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | 0.011     | -      | -      | -      | -      | -      | 0.012     | 0.013     | 0.012     | 0.0095    | 0.012     |
| berilio                | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | < 0.05    | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | < 0.0002  | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00018   | 0.00004   |
| calcio                 | mg/L     |                                                      | -                          | 3.13      | -      | -      | -      | -      | -      | 2.68      | 2.86      | 3.39      | 1.07      | 2.39      |
| cromo                  | mg/L     | 0.05                                                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| cobalto                | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |



Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W10 |           |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | -                          | 0.003     | -      | -      | -      | -      | -      | 0.003     | 0.002     | 0.0025    | 0.012     | 0.0026    |
| hierro    | mg/L     | 0.3                                                  | -                          | 0.27      | -      | -      | -      | -      | -      | 0.24      | 0.22      | 0.28      | 0.47      | 0.22      |
| plomo     | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | -      | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | 0.0002    | 0.0002    |
| magnesio  | mg/L     |                                                      | -                          | 1.21      | -      | -      | -      | -      | -      | 1.27      | 1.36      | 1.68      | 0.61      | 1.11      |
| manganeso | mg/L     | 0.1                                                  | -                          | 0.012     | -      | -      | -      | -      | -      | 0.015     | 0.007     | 0.0055    | 0.036     | 0.017     |
| mercurio  | mg/L     | 0.001                                                | -                          | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | 0.5       | -      | -      | -      | -      | -      | 0.4       | 0.4       | 0.48      | 0.37      | 0.38      |
| selenio   | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | 5.6       | -      | -      | -      | -      | -      | 5.7       | 6.1       | 7.47      | 3.45      | 5.03      |
| plata     | mg/L     | 0.05                                                 | -                          | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | 2.84      | -      | -      | -      | -      | -      | 3.17      | 3.44      | 3.7       | 1.61      | 2.85      |
| estroncio | mg/L     | 4.4                                                  | -                          | 0.021     | -      | -      | -      | -      | -      | 0.02      | 0.022     | 0.028     | 0.0091    | 0.02      |
| telurio   | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | 0.00004   |
| torio     | mg/L     |                                                      | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | 0.001     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0043    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | -                          | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.001     | 0.0021    | 0.0006    |
| zinc      | mg/L     | 5                                                    | -                          | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.005     | 0.003     |
| zirconio  | mg/L     |                                                      | -                          | < 0.01    | -      | -      | -      | -      | -      | < 0.06    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |        |         |          |                |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|---------|----------|----------------|--------|
|                                                               |                                         |                                                      | Mínimo                     | Máximo | Media   | Promedio | Desv. Estándar | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |         |          |                |        |
| temperatura                                                   | °C                                      | ≤15                                                  | 22.7                       | 30.6   | 25.6    | 25.6348  | 1.758          | 23     |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 5.7                        | 7.6    | 6.925   | 6.4      | -              | 18     |
| conductividad                                                 | µS/cm                                   |                                                      | 20                         | 197    | 43      | 63.8421  | 51.5216        | 19     |
| redox                                                         | mV                                      |                                                      | 40                         | 327    | 190     | 187.765  | 90.0295        | 17     |
| turbidez                                                      | NTU                                     | 1                                                    | 0.36                       | 52.5   | 6.55    | 10.7907  | 13.4434        | 15     |
| General Parámetros                                            |                                         |                                                      |                            |        |         |          |                |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 6.33                       | 7.41   | 7.06994 | 6.92766  | -              | 24     |
| conductividad                                                 | µS/cm                                   |                                                      | 19                         | 50     | 42      | 39.7292  | 8.05279        | 24     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 4.2                        | 14     | 11      | 10.5542  | 2.81934        | 24     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 5.2                        | 15.4   | 11.85   | 10.6667  | 2.72583        | 24     |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | <10                        | 53     | 38      | 34.1667  | 14.7697        | 24     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | <1                         | 248    | 2.5     | 23.125   | 61.2362        | 24     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 5                          | 20.3   | 11.775  | 11.9696  | 3.39765        | 24     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 6.1                        | 24.7   | 14.35   | 14.6379  | 4.13194        | 24     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | <0.5                       | <0.5   | -       | -        | -              | 24     |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | <0.5                       | <0.5   | -       | -        | -              | 24     |
| Nutrientes                                                    |                                         |                                                      |                            |        |         |          |                |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | <0.01                      | 0.03   | <0.01   | <0.01    | 0.00683        | 24     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.03                       | 0.23   | 0.1     | 0.10396  | 0.04051        | 24     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.03                       | 0.23   | 0.1     | 0.10694  | 0.04522        | 18     |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | <0.002                     | 0.003  | <0.002  | <0.002   | 0.00041        | 24     |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | <0.2                       | 0.4    | <0.2    | <0.2     | 0.08805        | 24     |
| Aniones                                                       |                                         |                                                      |                            |        |         |          |                |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 0.7                        | 4.59   | 3.235   | 3.03125  | 0.82106        | 24     |
| fluoruro                                                      | mg/L                                    | 1                                                    | <0.05                      | <0.05  | -       | -        | -              | 24     |
| sulfato                                                       | mg/L                                    | 250                                                  | 0.89                       | 5.66   | 3.36    | 3.36583  | 1.21446        | 24     |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |         |          |                |        |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|---------|----------|----------------|--------|
|                                      |             |                                                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Estándar | Conteo |
| Orgánicos                            |             |                                                      |                            |          |         |          |                |        |
| nitrógeno orgánico total             | mg/L        |                                                      | <0.2                       | 0.4      | <0.2    | <0.2     | 0.08805        | 24     |
| demanda química de oxígeno           | mg/L        |                                                      | <10                        | 120      | 10      | 19.7917  | 23.1103        | 24     |
| carbono orgánico disuelto            | mg/L como C |                                                      | <1                         | 3        | 1.4     | 1.46522  | 0.661          | 23     |
| aceite y grasa totales               | mg/L        |                                                      | <2                         | 6        | <2      | 2.13043  | 1.7915         | 23     |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | <2                         | <2       | -       | -        | -              | 23     |
| fenoles totales                      | mg/L        | 0.001                                                | <0.001                     | 0.013    | <0.001  | 0.00175  | 0.00324        | 24     |
| coliformes totales                   | CFU/100mL   |                                                      | 800                        | 13,700   | 4,300   | 4304.17  | 3559.65        | 12     |
| coliformes fecales                   | CFU/100mL   |                                                      | 100                        | 2,600    | 1,050   | 1125     | 772.393        | 12     |
| Especies de Cianuro                  |             |                                                      |                            |          |         |          |                |        |
| cianuro total                        | mg/L        | 0.001                                                | <0.002                     | <0.01    | -       | -        | -              | 24     |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | <0.002                     | <0.01    | -       | -        | -              | 24     |
| Metales Disueltos                    |             |                                                      |                            |          |         |          |                |        |
| aluminio                             | mg/L        |                                                      | 0.004                      | 0.23     | 0.014   | 0.03883  | 0.0569         | 24     |
| antimonio                            | mg/L        |                                                      | <0.0002                    | 0.0005   | 0.0002  | 0.00028  | 0.00019        | 24     |
| arsénico                             | mg/L        |                                                      | <0.0002                    | 0.0005   | <0.0002 | 0.00028  | 0.0002         | 24     |
| bario                                | mg/L        |                                                      | 0.0039                     | 0.012    | 0.0095  | 0.00906  | 0.00211        | 24     |
| berilio                              | mg/L        |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| bismuto                              | mg/L        |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| boro                                 | mg/L        |                                                      | <0.01                      | 0.08     | <0.01   | 0.01583  | 0.01672        | 24     |
| cadmio                               | mg/L        |                                                      | <0.00004                   | 0.00019  | 0.00006 | 6.7E-05  | 5.3E-05        | 24     |
| calcio                               | mg/L        |                                                      | 0.83                       | 3.15     | 2.5     | 2.3325   | 0.66958        | 24     |
| cromo                                | mg/L        |                                                      | <0.0002                    | 0.0005   | <0.0002 | 0.00027  | 0.0002         | 24     |
| cobalto                              | mg/L        |                                                      | <0.0002                    | 0.0071   | 0.0007  | 0.00181  | 0.00219        | 24     |
| cobre                                | mg/L        |                                                      | 0.0016                     | 0.02     | 0.0051  | 0.00569  | 0.0044         | 24     |
| hierro                               | mg/L        |                                                      | <0.03                      | 0.23     | 0.0775  | 0.09563  | 0.05247        | 24     |
| plomo                                | mg/L        |                                                      | <0.0002                    | 0.0008   | <0.0002 | 0.0003   | 0.00023        | 24     |
| litio                                | mg/L        |                                                      | <0.0002                    | 0.001    | 0.00025 | 0.00037  | 0.00029        | 24     |
| magnesio                             | mg/L        |                                                      | 0.51                       | 1.53     | 1.24    | 1.16229  | 0.28753        | 24     |
| manganeso                            | mg/L        |                                                      | <0.0002                    | 0.049    | 0.0285  | 0.02478  | 0.01291        | 24     |
| mercurio                             | mg/L        |                                                      | <0.00002                   | <0.00002 | -       | -        | -              | 24     |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |         |          |                |        |
|------------------------|----------|------------------------------------------------------|----------------------------|----------|---------|----------|----------------|--------|
|                        |          |                                                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Estándar | Conteo |
| molibdeno              | ug/L     |                                                      | <0.0001                    | 0.0005   | 0.00028 | 0.00028  | 0.00013        | 24     |
| níquel                 | mg/L     |                                                      | <0.0002                    | 0.001    | 0.0005  | 0.00043  | 0.00027        | 24     |
| fósforo                | mg/L     |                                                      | <0.03                      | <0.15    | -       | -        | -              | 24     |
| potasio                | mg/L     |                                                      | 0.33                       | 0.66     | 0.5     | 0.50042  | 0.09134        | 24     |
| selenio                | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| sílice                 | mg/L     |                                                      | 2.98                       | 7.2      | 5.7     | 5.47625  | 1.30422        | 24     |
| plata                  | mg/L     |                                                      | <0.00005                   | <0.00025 | -       | -        | -              | 24     |
| sodio                  | mg/L     |                                                      | 1.44                       | 3.4      | 2.975   | 2.81167  | 0.5521         | 24     |
| estroncio              | mg/L     |                                                      | 0.0072                     | 0.026    | 0.0195  | 0.01863  | 0.00491        | 24     |
| telurio                | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| talio                  | mg/L     |                                                      | <0.00002                   | <0.0001  | -       | -        | -              | 24     |
| torio                  | mg/L     |                                                      | <0.0001                    | <0.0005  | -       | -        | -              | 24     |
| estaño                 | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| titanio                | mg/L     |                                                      | <0.0003                    | 0.0049   | 0.0005  | 0.00102  | 0.00118        | 24     |
| uranio                 | mg/L     |                                                      | <0.0001                    | <0.0005  | -       | -        | -              | 24     |
| vanadio                | mg/L     |                                                      | <0.0002                    | 0.0008   | 0.0005  | 0.00048  | 0.00018        | 24     |
| zinc                   | mg/L     |                                                      | <0.001                     | 0.007    | 0.003   | 0.00375  | 0.00193        | 24     |
| zirconio               | mg/L     |                                                      | <0.002                     | <0.01    | -       | -        | -              | 24     |
| <b>Metales Totales</b> |          |                                                      |                            |          |         |          |                |        |
| aluminio               | mg/L     | 0.2                                                  | 0.012                      | 1.63     | 0.0825  | 0.22996  | 0.35778        | 24     |
| antimonio              | mg/L     | 0.005                                                | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| arsénico               | mg/L     | 0.01                                                 | <0.0002                    | 0.0005   | 0.0002  | 0.00029  | 0.0002         | 24     |
| bario                  | mg/L     | 0.7                                                  | 0.007                      | 0.02     | 0.011   | 0.01123  | 0.00257        | 24     |
| berilio                | mg/L     | 0.0146                                               | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| bismuto                | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| boro                   | mg/L     | 5                                                    | <0.01                      | 0.08     | 0.015   | 0.0175   | 0.01635        | 24     |
| cadmio                 | mg/L     | 0.003                                                | <0.00004                   | 0.00018  | 0.0001  | 7E-05    | 5E-05          | 24     |
| calcio                 | mg/L     |                                                      | 0.99                       | 3.39     | 2.45    | 2.28896  | 0.64632        | 24     |
| cromo                  | mg/L     | 0.05                                                 | <0.0002                    | 0.0008   | 0.0004  | 0.00033  | 0.00022        | 24     |
| cobalto                | mg/L     |                                                      | <0.0002                    | 0.0028   | 0.0005  | 0.0005   | 0.00057        | 24     |
| cobre                  | mg/L     | 1                                                    | 0.002                      | 0.101    | 0.008   | 0.01453  | 0.02326        | 24     |

Tabla 16      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Petaquilla) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |         |          |                |        |
|-----------|----------|------------------------------------------------------|----------------------------|----------|---------|----------|----------------|--------|
|           |          |                                                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Estándar | Conteo |
| hierro    | mg/L     | 0.3                                                  | 0.08                       | 1.85     | 0.22    | 0.34063  | 0.41217        | 24     |
| plomo     | mg/L     | 0.01                                                 | <0.0002                    | 0.002    | 0.0005  | 0.00042  | 0.00042        | 24     |
| litio     | mg/L     | 0.0146                                               | <0.0002                    | 0.001    | 0.0005  | 0.00046  | 0.00025        | 24     |
| magnesio  | mg/L     |                                                      | 0.61                       | 1.68     | 1.28    | 1.20229  | 0.27791        | 24     |
| manganeso | mg/L     | 0.1                                                  | 0.0055                     | 0.192    | 0.0275  | 0.03654  | 0.04014        | 24     |
| mercurio  | mg/L     | 0.001                                                | <0.00002                   | <0.00002 | -       | -        | -              | 24     |
| molibdeno | mg/L     | 0.07                                                 | <0.0001                    | 0.0006   | 0.00025 | 0.00027  | 0.00014        | 24     |
| níquel    | mg/L     | 0.02                                                 | <0.0002                    | 0.0005   | 0.0003  | 0.0003   | 0.0002         | 24     |
| fósforo   | mg/L     | 0.000146                                             | <0.03                      | <0.15    | -       | -        | -              | 24     |
| potasio   | mg/L     |                                                      | 0.37                       | 0.66     | 0.5     | 0.49917  | 0.08692        | 24     |
| selenio   | mg/L     | 0.01                                                 | <0.0002                    | 0.002    | 0.0005  | 0.00038  | 0.0004         | 24     |
| sílice    | mg/L     |                                                      | 3.41                       | 7.8      | 5.6     | 5.53458  | 1.29306        | 24     |
| plata     | mg/L     | 0.05                                                 | <0.00005                   | 0.0013   | 9.3E-05 | 0.00013  | 0.00025        | 24     |
| sodio     | mg/L     | ≤ 200                                                | 1.47                       | 3.7      | 3.02    | 2.86729  | 0.60701        | 24     |
| estroncio | mg/L     | 4.4                                                  | 0.0091                     | 0.028    | 0.02    | 0.01905  | 0.00492        | 24     |
| telurio   | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| talio     | mg/L     |                                                      | <0.00001                   | 0.00005  | 0.00001 | 2.4E-05  | 2E-05          | 24     |
| torio     | mg/L     |                                                      | <0.0001                    | <0.0005  | -       | -        | -              | 24     |
| estaño    | mg/L     | 4.4                                                  | <0.0002                    | <0.001   | -       | -        | -              | 24     |
| titanio   | mg/L     |                                                      | <0.0006                    | 0.0096   | 0.0008  | 0.00191  | 0.00221        | 24     |
| uranio    | mg/L     | 0.02                                                 | <0.0001                    | <0.0005  | -       | -        | -              | 24     |
| vanadio   | mg/L     |                                                      | <0.0003                    | 0.0054   | 0.0005  | 0.00098  | 0.0011         | 24     |
| zinc      | mg/L     | 5                                                    | <0.002                     | 0.013    | 0.003   | 0.00425  | 0.00259        | 24     |
| zirconio  | mg/L     |                                                      | <0.002                     | <0.12    | -       | -        | -              | 24     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la salud.

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W9 |         |        |        |        |        |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|--------|--------|--------|--------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |        |        |        |        |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 26.5                      | 27      | -      | -      | -      | -      | 23.8    | 25.1   | 25.7    | 24.6    | 24.3    | 25.1    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 6.1     | -      | -      | -      | -      | 6.87    | -      | 7.53    | 7.3     | 6.94    | 7.24    |
| conductividad                                                 | µS/cm                                   |                                                      | 40                        | 50      | -      | -      | -      | -      | 46      | 56     | -       | 70      | 30      | 230     |
| redox                                                         | mV                                      |                                                      | 220                       | 181     | -      | -      | -      | -      | -       | 56     | -       | 310     | 185     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | -      | -      | -      | -      | 5.3     | 0.97   | -       | 1.07    | 23      | 1.06    |
| General Parámetros                                            |                                         |                                                      |                           |         |        |        |        |        |         |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.18                      | 7.41    | -      | -      | -      | -      | 7.01    | 7.33   | 7.56    | 7.36    | 6.85    | 7.4     |
| conductividad                                                 | µS/cm                                   |                                                      | 45                        | 53      | -      | -      | -      | -      | 44      | 56     | 58      | 59      | 30      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 14.5                      | 17.5    | -      | -      | -      | -      | 13.8    | 16     | 20      | 16.7    | 7.9     | 14.8    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 14.5                      | 15.5    | -      | -      | -      | -      | 12.5    | 18     | 16      | 19      | 8.4     | 14.6    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 55                        | 38.5    | -      | -      | -      | -      | 58      | 64     | 59      | 57      | 23      | 41      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 1                         | < 1     | -      | -      | -      | -      | 6       | < 1    | < 1     | 2       | 40      | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 20.1                      | 20.05   | -      | -      | -      | -      | 14.5    | 19.2   | 24.8    | 26.3    | 11.2    | 22.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 24.5                      | 24.45   | -      | -      | -      | -      | 17.6    | 23.4   | 30.2    | 32.1    | 13.7    | 27.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |        |        |        |        |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | -      | -      | -      | -      | < 0.01  | < 0.01 | 0.02    | < 0.01  | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.05                      | 0.075   | -      | -      | -      | -      | 0.15    | 0.06   | 0.06    | 0.08    | 0.17    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.05                      | 0.075   | -      | -      | -      | -      | 0.15    | 0.06   | 0.06    | -       | -       | 0.09    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | -      | -      | -      | -      | < 0.002 | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                     | < 0.2   | -      | -      | -      | -      | < 0.2   | < 0.2  | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |        |        |        |        |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.7                       | 3.275   | -      | -      | -      | -      | 3.58    | 3.37   | 3.38    | 3.33    | 2.01    | 3.98    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | -      | -      | -      | -      | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | < 0.5                     | 1.485   | -      | -      | -      | -      | 1.95    | 2.36   | 1.99    | 1.82    | 1.51    | 1.91    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W9 |          |        |        |        |        |           |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|--------|--------|--------|--------|-----------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                     | < 0.2    | -      | -      | -      | -      | < 0.2     | < 0.2    | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                      | 23       | -      | -      | -      | -      | < 20      | 23       | < 20     | < 20      | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 2                         | 2.75     | -      | -      | -      | -      | 1.6       | 2.5      | 1.3      | 2.1       | 2.2       | 1.1       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | 4        | -      | -      | -      | -      | < 2       | 4        | < 2      | 3         | 10        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | -      | -      | -      | -      | < 2       | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | 0.004                     | 0.009    | -      | -      | -      | -      | 0.004     | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -         | 3,800    | 6,500    | 7,000     | 11,200    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -         | 1,700    | 900      | 1,900     | 1,300     | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | -      | -      | -      | -      | < 0.01    | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |        |        |        |        |           |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      | 0.037                     | 0.018    | -      | -      | -      | -      | 0.058     | 0.007    | 0.16     | 0.007     | 0.19      | 0.01      |
| antimonio                            | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | 0.0003    | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.022                     | 0.0235   | -      | -      | -      | -      | 0.015     | 0.017    | 0.021    | 0.021     | 0.0096    | 0.019     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | -      | -      | -      | -      | 0.01      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | -      | -      | -      | -      | < 0.00004 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | 3.48                      | 4.225    | -      | -      | -      | -      | 3.26      | 3.71     | 4.73     | 4.07      | 1.75      | 3.58      |
| cromo                                | mg/L        |                                                      | 0.0003                    | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    |
| cobalto                              | mg/L        |                                                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | 0.0011    | < 0.001  | < 0.001  | 0.0055    | 0.0003    | 0.0073    |
| cobre                                | mg/L        |                                                      | 0.0024                    | 0.002    | -      | -      | -      | -      | 0.0024    | 0.001    | 0.001    | 0.0013    | 0.005     | 0.0029    |
| hierro                               | mg/L        |                                                      | 0.12                      | 0.205    | -      | -      | -      | -      | 0.14      | 0.11     | 0.16     | 0.21      | 0.15      | 0.17      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | < 0.0002  | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | < 0.0002  | 0.001    | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W9 |           |        |        |        |        |           |           |           |           |           |           |
|-----------------|----------|------------------------------------------------------|---------------------------|-----------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio        | mg/L     |                                                      | 1.41                      | 1.59      | -      | -      | -      | -      | 1.38      | 1.59      | 2.05      | 1.58      | 0.86      | 1.42      |
| manganeso       | mg/L     |                                                      | 0.02                      | 0.0145    | -      | -      | -      | -      | 0.038     | 0.029     | 0.035     | 0.034     | 0.031     | 0.048     |
| mercurio        | mg/L     |                                                      | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | < 0.00002 | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | 0.0005                    | 0.0006    | -      | -      | -      | -      | 0.0004    | < 0.0005  | 0.0007    | 0.0008    | < 0.0001  | 0.0003    |
| níquel          | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | 0.0002    | < 0.001   | < 0.001   | 0.0008    | < 0.0002  | 0.001     |
| fósforo         | mg/L     |                                                      | < 0.03                    | < 0.15    | -      | -      | -      | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | 0.7                       | 0.8       | -      | -      | -      | -      | 0.67      | 0.6       | 0.7       | 0.76      | 0.46      | 0.6       |
| selenio         | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | 8.96                      | 10.75     | -      | -      | -      | -      | 7.22      | 8.9       | 10.8      | 10.4      | 4.98      | 7.34      |
| plata           | mg/L     |                                                      | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | 3.74                      | 4.355     | -      | -      | -      | -      | 3.61      | 3.75      | 4.73      | 3.99      | 2.08      | 3.49      |
| estroncio       | mg/L     |                                                      | 0.033                     | 0.0395    | -      | -      | -      | -      | 0.03      | 0.032     | 0.042     | 0.042     | 0.016     | 0.031     |
| telurio         | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | < 0.00002 | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | 0.0008                    | < 0.001   | -      | -      | -      | -      | 0.0018    | < 0.001   | < 0.001   | 0.0006    | 0.0025    | 0.0004    |
| uranio          | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | 0.0009                    | < 0.001   | -      | -      | -      | -      | 0.0008    | < 0.001   | < 0.001   | 0.0008    | 0.0008    | 0.0005    |
| zinc            | mg/L     |                                                      | 0.003                     | < 0.005   | -      | -      | -      | -      | 0.002     | < 0.005   | < 0.005   | 0.001     | 0.004     | 0.005     |
| zirconio        | mg/L     |                                                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | < 0.002   | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                           |           |        |        |        |        |           |           |           |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | 0.087                     | 0.0355    | -      | -      | -      | -      | 0.18      | 0.22      | 0.029     | 0.027     | 0.42      | 0.025     |
| antimonio       | mg/L     | 0.005                                                | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | 0.02                      | 0.0215    | -      | -      | -      | -      | 0.017     | 0.019     | 0.023     | 0.024     | 0.016     | 0.019     |
| berilio         | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | < 0.01                    | < 0.05    | -      | -      | -      | -      | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002  | -      | -      | -      | -      | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |



Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W9 |           |        |        |        |        |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| calcio    | mg/L     |                                                      | 3.19                      | 3.8       | -      | -      | -      | -      | 2.83      | 4.13      | 4.1       | 4.41      | 1.8       | 3.46      |
| cromo     | mg/L     | 0.05                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| cobalto   | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0005    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | 0.0036                    | 0.002     | -      | -      | -      | -      | 0.0038    | 0.002     | 0.002     | 0.0018    | 0.0097    | 0.002     |
| hierro    | mg/L     | 0.3                                                  | 0.2                       | 0.27      | -      | -      | -      | -      | 0.25      | 0.24      | 0.43      | 0.34      | 0.37      | 0.23      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                    | < 0.001   | -      | -      | -      | -      | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| magnesio  | mg/L     |                                                      | 1.58                      | 1.49      | -      | -      | -      | -      | 1.31      | 1.75      | 1.5       | 1.94      | 0.94      | 1.45      |
| manganeso | mg/L     | 0.1                                                  | 0.012                     | 0.0125    | -      | -      | -      | -      | 0.022     | 0.036     | 0.004     | 0.02      | 0.056     | 0.032     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0004                    | 0.0006    | -      | -      | -      | -      | 0.0004    | < 0.0005  | < 0.0005  | 0.0006    | < 0.0001  | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | -      | -      | -      | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.65                      | 0.75      | -      | -      | -      | -      | 0.63      | 0.7       | 0.7       | 0.74      | 0.49      | 0.58      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 8.84                      | 10.1      | -      | -      | -      | -      | 6.87      | 9.2       | 9.7       | 11.4      | 5.43      | 7.41      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 4.13                      | 4.025     | -      | -      | -      | -      | 3.42      | 4.07      | 4.6       | 4.63      | 2.14      | 3.37      |
| estroncio | mg/L     | 4.4                                                  | 0.031                     | 0.0365    | -      | -      | -      | -      | 0.026     | 0.035     | 0.042     | 0.043     | 0.016     | 0.032     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | -      | -      | -      | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0013                    | < 0.001   | -      | -      | -      | -      | 0.003     | < 0.001   | < 0.001   | 0.0008    | 0.0048    | 0.0006    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0009                    | < 0.001   | -      | -      | -      | -      | 0.0009    | < 0.001   | < 0.001   | 0.0008    | 0.002     | 0.0006    |
| zinc      | mg/L     | 5                                                    | 0.003                     | < 0.005   | -      | -      | -      | -      | 0.002     | < 0.005   | < 0.005   | 0.002     | 0.006     | 0.003     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | < 0.002   | < 0.11    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W3 |         |        |        |        |        |        |        |         |        |         |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|--------|--------|--------|--------|--------|--------|---------|--------|---------|--------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09 |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| temperatura                                                   | °C                                      | ≤15                                                  | n/a                       | 24.6    | -      | -      | -      | -      | -      | 25.5   | 26.4    | 25.8   | 24.2    | 25.1   |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 5.9     | -      | -      | -      | -      | -      | -      | 7.47    | 7.5    | 6.6     | 7.3    |
| conductividad                                                 | µS/cm                                   |                                                      | n/a                       | 50      | -      | -      | -      | -      | -      | 51     | -       | 70     | 20      | 494    |
| redox                                                         | mV                                      |                                                      | 210                       | 175     | -      | -      | -      | -      | -      | 114    | -       | 327    | 225     | 60     |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | -      | -      | -      | -      | -      | 7.57   | -       | 1.22   | 12.3    | 0.87   |
| General Parámetros                                            |                                         |                                                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.34                      | 7.2     | -      | -      | -      | -      | -      | 7.33   | 7.6     | 7.57   | 6.73    | 7.58   |
| conductividad                                                 | µS/cm                                   |                                                      | 47                        | 45      | -      | -      | -      | -      | -      | 51     | 56      | 64     | 23      | 56     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 15.9                      | 15      | -      | -      | -      | -      | -      | 13     | 18      | 17.6   | 6.2     | 14.2   |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 15.8                      | 13      | -      | -      | -      | -      | -      | 15     | 18      | 20     | 6.6     | 14.1   |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 39                        | 55      | -      | -      | -      | -      | -      | 51     | 62      | 50     | 16      | 62     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 3                         | 5       | -      | -      | -      | -      | -      | 1      | 4       | 2      | 21      | < 1    |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 21.6                      | 16.7    | -      | -      | -      | -      | -      | 18.5   | 25      | 30.3   | 8.8     | 25.2   |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 26.3                      | 20.3    | -      | -      | -      | -      | -      | 22.5   | 30.5    | 37     | 10.7    | 30.7   |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5  |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5  |
| Nutrientes                                                    |                                         |                                                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | -      | -      | -      | -      | -      | 0.01   | 0.02    | < 0.01 | < 0.01  | < 0.01 |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                         | 0.2     | -      | -      | -      | -      | -      | 0.08   | 0.06    | 0.1    | 0.14    | 0.05   |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.07                      | 0.2     | -      | -      | -      | -      | -      | 0.08   | 0.06    | -      | -       | 0.05   |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | -      | -      | -      | -      | -      | <0.002 | < 0.002 | 0.002  | < 0.002 | 0.003  |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                     | 0.3     | -      | -      | -      | -      | -      | 0.3    | < 0.2   | < 0.2  | < 0.2   | < 0.2  |
| Aniones                                                       |                                         |                                                      |                           |         |        |        |        |        |        |        |         |        |         |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.95                      | 2.8     | -      | -      | -      | -      | -      | 3.58   | 3.4     | 3.73   | 1.84    | 4.26   |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05 | < 0.05  | < 0.05 |
| sulfato                                                       | mg/L                                    | 250                                                  | 1.23                      | 0.83    | -      | -      | -      | -      | -      | 1.26   | 1.13    | 1.32   | 1.05    | 1.19   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W3 |          |        |        |        |        |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|--------|--------|--------|--------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |        |        |        |        |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                         | 0.3      | -      | -      | -      | -      | -      | 0.3      | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                      | 20       | -      | -      | -      | -      | -      | 26       | < 20     | 72        | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 1.8                       | 3.8      | -      | -      | -      | -      | -      | 3.6      | 1.4      | 1.8       | 3         | 1.3       |
| aceite y grasa totales               | mg/L        |                                                      | 2                         | 4        | -      | -      | -      | -      | -      | 4        | < 2      | 7         | 9         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | -      | -      | -      | -      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                   | 0.006    | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -      | 1,600    | 12,800   | 4,000     | 11,400    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -      | -      | -      | -      | -      | 1,000    | 1,800    | 1,400     | 2,100     | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |        |        |        |        |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |        |        |        |        |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      | 0.026                     | 0.055    | -      | -      | -      | -      | -      | 0.017    | 0.013    | 0.006     | 0.17      | 0.009     |
| antimonio                            | mg/L        |                                                      | 0.0004                    | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0002    | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.017                     | 0.019    | -      | -      | -      | -      | -      | 0.016    | 0.022    | 0.021     | 0.0095    | 0.021     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | 3.91                      | 3.5      | -      | -      | -      | -      | -      | 3.22     | 4.46     | 4.45      | 1.42      | 3.48      |
| cromo                                | mg/L        |                                                      | 0.0003                    | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | 0.0002    | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0078                    | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0031    | 0.0026    | 0.0003    |
| cobre                                | mg/L        |                                                      | 0.0018                    | 0.002    | -      | -      | -      | -      | -      | 0.002    | 0.002    | 0.0014    | 0.0049    | 0.0019    |
| hierro                               | mg/L        |                                                      | 0.17                      | 0.28     | -      | -      | -      | -      | -      | 0.16     | 0.32     | 0.35      | 0.17      | 0.23      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | 0.0002                    | < 0.001  | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W3 |             |        |        |        |        |        |             |              |              |             |              |
|------------------------|----------|------------------------------------------------------|---------------------------|-------------|--------|--------|--------|--------|--------|-------------|--------------|--------------|-------------|--------------|
|                        |          |                                                      | Sept-07                   | Oct-07      | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08      | Sept-08      | Oct-08       | Nov-08      | Feb-09       |
| magnesio               | mg/L     |                                                      | 1.5                       | 1.4         | -      | -      | -      | -      | -      | 1.26        | 1.7          | 1.58         | 0.64        | 1.33         |
| manganeso              | mg/L     |                                                      | 0.023                     | 0.002       | -      | -      | -      | -      | -      | 0.008       | 0.002        | 0.0078       | 0.018       | 0.017        |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002   | -      | -      | -      | -      | -      | < 0.00002   | <0.00002     | < 0.00002    | < 0.00002   | < 0.00002    |
| molibdeno              | ug/L     |                                                      | 0.0004                    | < 0.0005    | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005     | 0.0006       | < 0.0001    | 0.0003       |
| níquel                 | mg/L     |                                                      | 0.001                     | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | 0.0008       | 0.0003      | < 0.0002     |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15      | -      | -      | -      | -      | -      | < 0.15      | < 0.15       | < 0.03       | < 0.03      | < 0.03       |
| potasio                | mg/L     |                                                      | 0.72                      | 1           | -      | -      | -      | -      | -      | 0.7         | 0.8          | 0.84         | 0.53        | 0.69         |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| sílice                 | mg/L     |                                                      | 10.3                      | 8.8         | -      | -      | -      | -      | -      | 8.7         | 12.5         | 11.9         | 4.63        | 8.33         |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025   | -      | -      | -      | -      | -      | < 0.00025   | < 0.00025    | < 0.00005    | < 0.00005   | < 0.00005    |
| sodio                  | mg/L     |                                                      | 4.04                      | 3.86        | -      | -      | -      | -      | -      | 3.96        | 5.22         | 4.65         | 1.95        | 3.94         |
| estroncio              | mg/L     |                                                      | 0.035                     | 0.035       | -      | -      | -      | -      | -      | 0.032       | 0.046        | 0.05         | 0.014       | 0.037        |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001    | -      | -      | -      | -      | -      | < 0.0001    | < 0.0001     | < 0.00002    | < 0.00002   | < 0.00002    |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005    | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005     | < 0.0001     | < 0.0001    | < 0.0001     |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| titanio                | mg/L     |                                                      | 0.001                     | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | 0.0006       | 0.0025      | 0.0004       |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005    | -      | -      | -      | -      | -      | < 0.0005    | < 0.0005     | < 0.0001     | < 0.0001    | < 0.0001     |
| vanadio                | mg/L     |                                                      | 0.0011                    | 0.001       | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | 0.001        | 0.0011      | 0.0005       |
| zinc                   | mg/L     |                                                      | 0.003                     | < 0.005     | -      | -      | -      | -      | -      | < 0.005     | < 0.005      | < 0.001      | 0.003       | 0.001        |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01      | -      | -      | -      | -      | -      | < 0.01      | < 0.01       | < 0.002      | < 0.002     | < 0.002      |
| <b>Metales Totales</b> |          |                                                      |                           |             |        |        |        |        |        |             |              |              |             |              |
| aluminio               | mg/L     | 0.2                                                  | <b>0.077</b>              | <b>0.14</b> | -      | -      | -      | -      | -      | <b>0.48</b> | <b>0.025</b> | <b>0.023</b> | <b>0.52</b> | <b>0.034</b> |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| bario                  | mg/L     | 0.7                                                  | 0.016                     | 0.019       | -      | -      | -      | -      | -      | 0.019       | 0.021        | 0.023        | 0.014       | 0.021        |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002     |
| boro                   | mg/L     | 5                                                    | 0.01                      | < 0.05      | -      | -      | -      | -      | -      | < 0.05      | < 0.05       | < 0.01       | < 0.01      | < 0.01       |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002    | -      | -      | -      | -      | -      | < 0.0002    | < 0.0002     | < 0.00004    | < 0.00004   | < 0.00004    |
| calcio                 | mg/L     |                                                      | 3.57                      | 3.23        | -      | -      | -      | -      | -      | 3.55        | 4.33         | 4.77         | 1.48        | 3.41         |
| cromo                  | mg/L     | 0.05                                                 | < 0.0002                  | < 0.001     | -      | -      | -      | -      | -      | < 0.001     | < 0.001      | 0.0003       | 0.0004      | < 0.0002     |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W3 |           |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | 0.0028                    | 0.003     | -      | -      | -      | -      | -      | 0.003     | 0.001     | 0.0016    | 0.0086    | 0.0019    |
| hierro    | mg/L     | 0.3                                                  | 0.26                      | 0.45      | -      | -      | -      | -      | -      | 0.31      | 0.22      | 0.5       | 0.45      | 0.41      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                    | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | 1.66                      | 1.29      | -      | -      | -      | -      | -      | 1.37      | 1.72      | 1.95      | 0.69      | 1.35      |
| manganeso | mg/L     | 0.1                                                  | 0.0066                    | 0.013     | -      | -      | -      | -      | -      | 0.011     | 0.004     | 0.0066    | 0.03      | 0.014     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | -      | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0004                    | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | 0.0005    | 0.0007    | < 0.0001  | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.66                      | 0.9       | -      | -      | -      | -      | -      | 0.8       | 0.6       | 0.85      | 0.54      | 0.68      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 10.1                      | 8         | -      | -      | -      | -      | -      | 8.9       | 9         | 13.5      | 5.12      | 8.39      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 4.68                      | 3.56      | -      | -      | -      | -      | -      | 4.31      | 4.2       | 5.55      | 1.97      | 3.92      |
| estroncio | mg/L     | 4.4                                                  | 0.034                     | 0.034     | -      | -      | -      | -      | -      | 0.035     | 0.039     | 0.052     | 0.015     | 0.037     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0018                    | 0.001     | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0009    | 0.0063    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0011                    | 0.001     | -      | -      | -      | -      | -      | 0.001     | < 0.001   | 0.001     | 0.0022    | 0.0008    |
| zinc      | mg/L     | 5                                                    | < 0.001                   | < 0.005   | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.004     | 0.001     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | -      | -      | -      | -      | -      | < 0.15    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | 25.5   | -       | 25.7    | 22.8    | 25.1    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.2     | 7.24    | 7.21    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 47     | -       | 60      | 40      | 507     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | 32     | -       | 227     | 238     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 1.14   | -       | 3.1     | 3.43    | 1.78    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | 7.23   | 7.57    | 7.46    | 7.15    | 7.62    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 48     | 56      | 49.5    | 34      | 53      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 12     | 10      | 10.25   | 7.6     | 10.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 11     | 15      | 11.7    | 7.8     | 10.4    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | 47     | 66      | 34      | 33      | 37      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | 1      | < 1     | 4       | 4       | 10      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | 18     | 25.6    | 24.4    | 13.5    | 24.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | 22     | 31.2    | 29.8    | 16.5    | 29.7    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | < 0.01  | 0.03    | < 0.01  | 0.07    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | 0.115   | 0.04    | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | -       | -       | 0.03    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.6    | < 0.2   | 0.4     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 3.57   | 3.49    | 3.19    | 2.87    | 4.26    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.67   | < 0.5   | 0.585   | 0.68    | 0.5     |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.6      | < 0.2    | 0.4       | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 26       | < 20     | < 20      | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | 3.7      | 1.8      | 5.9       | 1.9      | 2.3       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -        | 3         | < 2      | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -        | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -        | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2,100    | 7,900    | 13,300    | 18,200   | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 500      | 1,400    | 4,900     | 1,900    | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.022    | 0.015    | 0.025     | 0.061    | 0.018     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.025    | 0.021    | 0.024     | 0.015    | 0.026     |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00004  | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2.88     | 2.46     | 2.705     | 1.74     | 2.58      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0007    | 0.0018   | 0.0002    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.002    | < 0.001  | 0.0034    | 0.0037   | 0.0021    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.31     | 0.22     | 0.31      | 0.15     | 0.21      |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 1.05      | 0.95      | 0.855     | 0.8       | 1.01      |
| manganeso              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.023     | 0.007     | 0.00455   | 0.032     | 0.011     |
| mercurio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.00045   | 0.0003    | 0.0003    |
| níquel                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0002    | 0.0004    | < 0.0002  |
| fósforo                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.8       | 0.7       | 1.05      | 0.71      | 0.77      |
| selenio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 9.2       | 8.1       | 10.2      | 9.08      | 8.29      |
| plata                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4.2       | 4.26      | 3.815     | 3.33      | 4.16      |
| estroncio              | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.038     | 0.032     | 0.043     | 0.021     | 0.036     |
| telurio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | 0.00004   | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0006    | 0.0006    |
| uranio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0009    | 0.0005    |
| zinc                   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | < 0.001   |
| zirconio               | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |        |        |        |        |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.36      | 0.028     | 0.0605    | 0.13      | 0.05      |
| antimonio              | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.026     | 0.033     | 0.0285    | 0.015     | 0.026     |
| berilio                | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2.86      | 3.57      | 2.99      | 1.76      | 2.53      |
| cromo                  | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |



Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W23 |        |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 0.002     | 0.002     | 0.00245   | 0.0026    | 0.0024    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.46      | 0.46      | 0.42      | 0.29      | 0.44      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 1.03      | 1.41      | 1.025     | 0.82      | 0.99      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.017     | 0.005     | 0.0029    | 0.0076    | 0.012     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | 0.0006    | 0.0005    | 0.0003    | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.8       | 0.8       | 1.03      | 0.72      | 0.77      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | 0.003     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 9         | 11.7      | 10.6      | 10.1      | 8.13      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | 4.16      | 5.61      | 4.24      | 3.55      | 4.06      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.037     | 0.047     | 0.045     | 0.023     | 0.037     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.00105   | 0.0028    | 0.0008    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.00085   | 0.0011    | 0.0007    |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.001     | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.21    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |        |         |         |        |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08 | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | 24.7   | 27.9    | 27      | 24.1   | 25.5    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | 7.27    | 7.6     | 6.96   | 7.26    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 98     | -       | 120     | 40     | 516     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | 81     | -       | 260     | 168    | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 1.01   | -       | 0.9     | 3.87   | 4.23    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | 7.66   | 7.71    | 7.85    | 7.61   | 7.5     |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 98     | 96      | 102     | 40     | 60      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 39     | 52      | 36      | 13.1   | 19.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 37     | 38      | 40.1    | 13.7   | 19.7    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | 90     | 76      | 95      | 21     | 68      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 1    | < 1     | < 1     | 2      | 7       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | 39.8   | 46.3    | 54.4    | 17.8   | 27.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | 48.6   | 56.5    | 66.3    | 21.7   | 33.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5  | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5  | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | 0.02    | 0.03    | < 0.01 | 0.04    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | 0.06    | 0.13   | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | -       | -      | 0.08    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 2    | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.3    | < 0.2   | < 0.2   | < 0.2  | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |        |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 3.6    | 3.78    | 3.69    | 2.37   | 4.7     |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05 | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.61   | < 0.5   | < 0.5   | 0.74   | 0.66    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.3      | < 0.2    | < 0.2     | < 200     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 23       | < 20     | 78        | < 20,000  | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2.2      | 1.5      | 1.5       | 2,100     | 1.8       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 5        | < 2      | 3         | 10        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 1       | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 1,300    | 20,000   | 4,700     | 2,800     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 700      | 12,000   | 2,700     | 600       | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 2       | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 2       | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005  | 0.017    | 0.007     | 0.14      | 0.039     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.013    | 0.021    | 0.019     | 0.0077    | 0.011     |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 6.89     | 6.57     | 7.17      | 2.21      | 3.53      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | 0.0004    | 0.0014    | 0.0008    |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.002    | < 0.001  | 0.0037    | 0.0021    | 0.0012    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | 0.002    | 0.0011    | 0.0022    | 0.0022    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.06     | 0.34     | 0.25      | 0.22      | 0.14      |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |           |           |           |           |           |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 5.35      | 8.65      | 4.39      | 1.85      | 2.6       |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.018     | 0.019     | 0.017     | 0.01      | 0.018     |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | 0.0006    | < 0.0001  | < 0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0007    | 0.0009    | 0.0006    |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.5       | 0.8       | 0.72      | 0.41      | 0.46      |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 13.5      | 21.4      | 15.6      | 6.42      | 6.75      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4         | 9.41      | 4.34      | 2.15      | 3.02      |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.036     | 0.052     | 0.054     | 0.013     | 0.021     |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0007    | 0.0053    | 0.0019    |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.002     | 0.002     | 0.0021    | 0.0017    | 0.0012    |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |           |           |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.19      | 0.02      | 0.013     | 0.26      | 0.11      |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.015     | 0.02      | 0.019     | 0.0077    | 0.012     |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 6.52      | 6.78      | 7.33      | 2.3       | 3.43      |
| cromo           | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0004    | 0.0017    | 0.0012    |



Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W21 |        |        |        |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 0.001     | 0.001     | 0.0012    | 0.0026    | 0.0022    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.17      | 0.27      | 0.32      | 0.28      | 0.29      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4.94      | 5         | 5.27      | 1.93      | 2.7       |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.017     | 0.003     | 0.0054    | 0.0073    | 0.025     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | < 0.0005  | 0.0006    | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0002    | 0.0007    | 0.0007    |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.5       | 0.7       | 0.73      | 0.42      | 0.45      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 13.2      | 14.7      | 16.8      | 6.86      | 6.87      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | 4.04      | 5.45      | 5.09      | 2.18      | 2.99      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.037     | 0.046     | 0.054     | 0.013     | 0.022     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.0007    | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | < 0.001   | 0.0008    | 0.0075    | 0.0041    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.002     | 0.002     | 0.0019    | 0.0021    | 0.0016    |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.002     | 0.002     |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.20    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W12 |         |        |         |         |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|--------|---------|---------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |        |         |         |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | 24.4    | -      | 24.1    | 24      | -      | -      | 25.4   | 29.7    | 27.5    | 22.8    | 25.5    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | 5.6     | -      | 7.23    | 6.4     | -      | -      | -      | 7.41    | 7.7     | 7.24    | 7.24    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 30      | -      | 40      | 60      | -      | -      | 35     | -       | 70      | 40      | 388     |
| redox                                                         | mV                                      |                                                      | -                          | 170     | -      | 177     | -       | -      | -      | 116    | -       | 259     | 253     | 50      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -      | 10.21   | -       | -      | -      | 2.35   | -       | 4.69    | 2.1     | 2.86    |
| General Parámetros                                            |                                         |                                                      |                            |         |        |         |         |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | 7.1     | -      | 6.51    | 7.72    | -      | -      | 7.38   | 7.59    | 7.62    | 7.14    | 7.17    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 34      | -      | 39      | 87      | -      | -      | 34     | 52      | 62      | 34      | 42      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 10      | -      | 10      | 15      | -      | -      | 8      | 17.5    | 16.6    | 8.8     | 10.7    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 10      | -      | 10      | 16      | -      | -      | 9      | 15.5    | 18.9    | 8.8     | 11.1    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | 41      | -      | 36      | 43      | -      | -      | 45     | 49      | 41      | 28      | 27      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | 10      | -      | 9       | < 1     | -      | -      | 28     | 11      | 3       | 3       | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | 12      | -      | 14.3    | 31.4    | -      | -      | 9.47   | 22.45   | 28      | 11.9    | 13.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | 14.7    | -      | 17.4    | 38.3    | -      | -      | 11.6   | 27.4    | 34.2    | 14.6    | 17      |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |        |         |         |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | -      | -      | < 0.01 | 0.03    | < 0.01  | 0.01    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | 0.13    | -      | 0.06    | < 0.05  | -      | -      | 0.06   | < 0.05  | 0.05    | 0.05    | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | 0.13    | -      | 0.06    | < 0.05  | -      | -      | 0.06   | < 0.05  | -       | -       | 0.03    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | -      | -      | <0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | 0.4     | -      | < 0.2   | < 0.2   | -      | -      | 0.8    | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |        |         |         |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | 2.34    | -      | 3.47    | 4.25    | -      | -      | 3.57   | 3.525   | 3.57    | 3.23    | 5.48    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | < 0.05  | -      | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | 0.96    | -      | 0.86    | 1.85    | -      | -      | 1.22   | 1.015   | 2.27    | 1.49    | 1.29    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W12 |          |        |          |          |        |        |          |           |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|--------|----------|----------|--------|--------|----------|-----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | 0.4      | -      | < 0.2    | < 0.2    | -      | -      | 0.8      | < 0.2     | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | < 20     | -      | < 20     | < 20     | -      | -      | 48       | < 20      | 245       | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | 4        | -      | 2.5      | 1.4      | -      | -      | 2.8      | 2.4       | 1.8       | 1.5       | 2.1       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | 3        | < 2       | 5         | 3         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | -      | -      | < 2      | < 2       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | 0.055    | -      | 0.029    | < 0.001  | -      | -      | < 0.001  | < 0.001   | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -      | -      | -        | 4200      | 2500      | -         | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -      | -      | -        | 1700      | 1100      | -         | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |        |          |          |        |        |          |           |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | 0.15     | -      | 0.09     | 0.009    | -      | -      | 0.073    | 0.2       | 0.071     | 0.049     | 0.071     |
| antimonio                            | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | 0.006    | -      | 0.013    | 0.008    | -      | -      | 0.008    | 0.0135    | 0.01      | 0.0061    | 0.0083    |
| berilio                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | < 0.05   | -      | < 0.05   | 0.14     | -      | -      | < 0.05   | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | 2.3      | -      | 2.46     | 3.34     | -      | -      | 1.87     | 4.405     | 4.04      | 1.91      | 2.36      |
| cromo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | 0.004    | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | 0.00035   | < 0.0002  | 0.0033    | 0.0002    |
| cobre                                | mg/L        |                                                      | -                          | 0.003    | -      | 0.001    | 0.002    | -      | -      | 0.002    | 0.00165   | 0.001     | 0.0013    | 0.0018    |
| hierro                               | mg/L        |                                                      | -                          | 0.23     | -      | 0.24     | 0.06     | -      | -      | 0.11     | 0.315     | 0.17      | 0.07      | 0.13      |
| plomo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | -      | -      | 0.001    | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W12 |           |        |           |           |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | 1.1       | -      | 1.03      | 1.66      | -      | -      | 0.83      | 1.58      | 1.58      | 0.96      | 1.16      |
| manganeso              | mg/L     |                                                      | -                          | 0.006     | -      | 0.009     | 0.005     | -      | -      | 0.007     | 0.011     | 0.0044    | 0.013     | 0.0069    |
| mercurio               | mg/L     |                                                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | 0.0002    | 0.0002    | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.0003    | < 0.0002  | 0.0005    | < 0.0002  |
| fósforo                | mg/L     |                                                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | 0.5       | -      | 0.6       | 0.5       | -      | -      | 0.5       | 0.79      | 0.63      | 0.43      | 0.42      |
| selenio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | 5.1       | -      | 6.3       | 6.9       | -      | -      | 4.1       | 10.9      | 9.72      | 7.18      | 4.47      |
| plata                  | mg/L     |                                                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | 2.49      | -      | 3.2       | 3.66      | -      | -      | 2.8       | 4.73      | 3.81      | 2.79      | 3.37      |
| estroncio              | mg/L     |                                                      | -                          | 0.016     | -      | 0.023     | 0.024     | -      | -      | 0.016     | 0.0375    | 0.035     | 0.014     | 0.019     |
| telurio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | 0.004     | -      | 0.002     | < 0.001   | -      | -      | < 0.001   | 0.00715   | 0.0028    | 0.001     | 0.0011    |
| uranio                 | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | 0.001     | -      | 0.001     | < 0.001   | -      | -      | < 0.001   | 0.00155   | 0.0013    | 0.0008    | 0.0006    |
| zinc                   | mg/L     |                                                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | -      | -      | < 0.005   | 0.0015    | < 0.001   | 0.002     | 0.001     |
| zirconio               | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |        |           |           |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | 0.2       | -      | 0.32      | 0.03      | -      | -      | 3.7       | 0.645     | 0.25      | 0.092     | 0.14      |
| antimonio              | mg/L     | 0.005                                                | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | 0.008     | -      | 0.016     | 0.009     | -      | -      | 0.014     | 0.019     | 0.013     | 0.0067    | 0.01      |
| berilio                | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | < 0.05    | -      | < 0.05    | 0.1       | -      | -      | < 0.05    | 0.09      | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | 2.29      | -      | 2.34      | 3.85      | -      | -      | 2.03      | 3.565     | 4.31      | 1.89      | 2.43      |
| cromo                  | mg/L     | 0.05                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W12 |           |        |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | 0.003     | -      | 0.002     | 0.001     | -      | -      | 0.005     | 0.003     | 0.0016    | 0.0012    | 0.002     |
| hierro    | mg/L     | 0.3                                                  | -                          | 0.32      | -      | 0.46      | 0.11      | -      | -      | 0.45      | 0.765     | 0.36      | 0.16      | 0.27      |
| plomo     | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.006     | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | 1.11      | -      | 1.01      | 1.64      | -      | -      | 0.9       | 1.56      | 1.99      | 1         | 1.22      |
| manganeso | mg/L     | 0.1                                                  | -                          | 0.007     | -      | 0.009     | 0.003     | -      | -      | 0.021     | 0.009     | 0.0047    | 0.0061    | 0.0082    |
| mercurio  | mg/L     | 0.001                                                | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | 0.00002   |
| molibdeno | mg/L     | 0.07                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | < 0.15    | -      | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | 0.5       | -      | 0.6       | 0.5       | -      | -      | 0.6       | 0.8       | 0.65      | 0.45      | 0.45      |
| selenio   | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | 5.2       | -      | 6.5       | 7         | -      | -      | 4.3       | 10.75     | 10.9      | 7.48      | 4.97      |
| plata     | mg/L     | 0.05                                                 | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | 2.46      | -      | 3.18      | 3.71      | -      | -      | 2.88      | 5.075     | 4.48      | 2.84      | 3.53      |
| estroncio | mg/L     | 4.4                                                  | -                          | 0.017     | -      | 0.022     | 0.025     | -      | -      | 0.018     | 0.0365    | 0.037     | 0.014     | 0.02      |
| telurio   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | < 0.001   | -      | < 0.001   | < 0.001   | -      | -      | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | 0.004     | -      | 0.005     | 0.001     | -      | -      | 0.006     | 0.0075    | 0.0044    | 0.0018    | 0.0025    |
| uranio    | mg/L     | 0.02                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | 0.002     | -      | 0.002     | < 0.001   | -      | -      | 0.002     | 0.0025    | 0.0017    | 0.001     | 0.001     |
| zinc      | mg/L     | 5                                                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | -      | -      | 0.01      | 0.012     | 0.002     | 0.001     | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | -      | -      | < 0.05    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W13 |         |        |         |         |         |        |        |         |        |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|--------|---------|---------|---------|--------|--------|---------|--------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07 | Dic-07  | Ene-08  | Mar-08  | May-08 | Jun-08 | Sept-08 | Oct-08 | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | 25.6    | -      | 25.2    | 25      | 25.6    | -      | 25.4   | 30.9    | 28.6   | 23.7    | 25.7    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | 5.7     | -      | 7.12    | 6.4     | 7.46    | -      | -      | 7.67    | 7.6    | 7.47    | 7.26    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 30      | -      | 40      | 60      | 96      | -      | 39     | -       | 70     | 60      | 244     |
| redox                                                         | mV                                      |                                                      | -                          | 176     | -      | 138     | -       | 57      | -      | 111    | -       | 318    | 217     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -      | 6.11    | -       | Missed  | -      | 9.95   | -       | 8.56   | 11.5    | 1.71    |
| General Parámetros                                            |                                         |                                                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | 6.95    | -      | 6.63    | 7.42    | 7.53    | -      | 7.16   | 7.54    | 7.4    | 6.7     | 7.38    |
| conductividad                                                 | µS/cm                                   |                                                      | -                          | 35      | -      | 44      | 62      | 56      | -      | 41     | 54      | 61     | 21      | 48      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 9       | -      | 11      | 12      | 15      | -      | 9      | 15.6    | 15.4   | 4.7     | 12.5    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | 9       | -      | 11      | 12      | 15      | -      | 10     | 15      | 17.2   | 5.2     | 12.6    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | -                          | 30      | -      | 53      | 60      | 55      | -      | 48     | 51      | 36     | 10      | 32      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | 15      | -      | 4       | 5       | < 1     | -      | 14     | 5       | 45     | 27      | 3       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | 11.1    | -      | 17.9    | 19.9    | 24.1    | -      | 13.4   | 24      | 29.1   | 8       | 21.9    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | 13.5    | -      | 21.9    | 24.3    | 29.4    | -      | 16.4   | 29.3    | 35.5   | 9.8     | 26.7    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | < 0.5   | -      | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | < 0.01  | -      | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01 | 0.05    | 0.06   | 0.03    | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | 0.24    | -      | 0.05    | < 0.1   | 0.01    | -      | 0.07   | < 0.05  | 0.04   | 0.07    | 0.03    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | 0.24    | -      | 0.05    | < 0.1   | 0.01    | -      | 0.07   | < 0.05  | -      | -       | 0.03    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | < 0.002 | -      | < 0.002 | < 0.002 | < 0.002 | -      | <0.002 | 0.004   | 0.008  | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | 0.5     | -      | 0.2     | < 0.2   | 0.2     | -      | 1.7    | < 0.2   | 0.3    | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |        |         |         |         |        |        |         |        |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | 3.36    | -      | 3.57    | 4.12    | 4.33    | -      | 3.42   | 3.66    | 3.9    | 1.93    | 4.25    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | < 0.05  | -      | < 0.05  | < 0.1   | < 0.05  | -      | < 0.05 | < 0.05  | < 0.05 | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | 0.94    | -      | 0.72    | < 1     | 0.76    | -      | 0.92   | 0.74    | 0.84   | 0.77    | 0.74    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W13 |          |        |          |          |          |        |          |           |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|--------|----------|----------|----------|--------|----------|-----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07 | Dic-07   | Ene-08   | Mar-08   | May-08 | Jun-08   | Sept-08   | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | 0.5      | -      | 0.2      | < 0.2    | 0.2      | -      | 1.7      | < 0.2     | 0.2       | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | 28       | -      | 160      | < 20     | < 20     | -      | 28       | < 20      | 26        | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | 5.5      | -      | 1.8      | 1.4      | 1.3      | -      | 5.2      | 1.8       | 2.1       | 3.3      | 1.3       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | 4        | < 2       | 7         | 2        | 3         |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | < 2      | -      | < 2      | < 2      | < 2      | -      | < 2      | < 2       | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | 0.018    | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.001   | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -        | -      | 11,200   | 5,300     | 2,400,000 | 19,000   | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -      | -        | -        | -        | -      | 4,400    | 2,900     | 1,600,000 | 5,700    | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | < 0.01   | -      | < 0.01   | < 0.01   | < 0.01   | -      | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |        |          |          |          |        |          |           |           |          |           |
| aluminio                             | mg/L        |                                                      | -                          | 0.12     | -      | 0.027    | 0.014    | 0.034    | -      | 0.051    | 0.031     | 0.079     | 0.17     | 0.025     |
| antimonio                            | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | 0.0002   | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | 0.013    | -      | 0.019    | 0.019    | 0.024    | -      | 0.014    | 0.021     | 0.018     | 0.0078   | 0.021     |
| berilio                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | < 0.05   | -      | < 0.05   | < 0.05   | < 0.05   | -      | < 0.05   | < 0.01    | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | < 0.0002 | -      | < 0.0002 | < 0.0002 | < 0.0002 | -      | < 0.0002 | < 0.00004 | < 0.00004 | 0.00017  | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | 2.3      | -      | 2.77     | 2.9      | 3.59     | -      | 2.23     | 3.74      | 3.65      | 1.1      | 3         |
| cromo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | -                          | 0.008    | -      | 0.001    | < 0.001  | < 0.001  | -      | 0.001    | 0.0006    | < 0.0002  | 0.0063   | 0.0027    |
| cobre                                | mg/L        |                                                      | -                          | 0.003    | -      | 0.001    | 0.001    | 0.001    | -      | 0.002    | 0.0014    | 0.0015    | 0.0032   | 0.002     |
| hierro                               | mg/L        |                                                      | -                          | 0.26     | -      | 0.21     | 0.26     | 0.19     | -      | 0.15     | 0.37      | 0.29      | 0.18     | 0.28      |
| plomo                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | < 0.001  | -      | < 0.001  | < 0.001  | < 0.001  | -      | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | 0.0002    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W13 |           |        |           |           |           |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| magnesio               | mg/L     |                                                      | -                          | 0.85      | -      | 1.02      | 1.14      | 1.52      | -      | 0.87      | 1.52      | 1.51      | 0.49      | 1.23      |
| manganeso              | mg/L     |                                                      | -                          | 0.037     | -      | 0.008     | 0.026     | 0.007     | -      | 0.009     | 0.027     | 0.0008    | 0.019     | 0.024     |
| mercurio               | mg/L     |                                                      | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | <0.00002  | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | 0.0003    | 0.0004    | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | -                          | 0.001     | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | 0.0006    | 0.001     | 0.0004    |
| fósforo                | mg/L     |                                                      | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | -                          | 0.9       | -      | 0.7       | 0.8       | 0.8       | -      | 0.8       | 0.85      | 0.85      | 0.55      | 0.74      |
| selenio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | -                          | 5.1       | -      | 8         | 9.8       | 11.2      | -      | 6.7       | 10.6      | 11.7      | 4.68      | 8.88      |
| plata                  | mg/L     |                                                      | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | -                          | 3.24      | -      | 3.72      | 4.04      | 5.47      | -      | 3.29      | 4.92      | 5.12      | 2.01      | 4.39      |
| estroncio              | mg/L     |                                                      | -                          | 0.021     | -      | 0.03      | 0.033     | 0.047     | -      | 0.025     | 0.042     | 0.043     | 0.012     | 0.036     |
| telurio                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | -                          | 0.002     | -      | 0.001     | < 0.001   | < 0.001   | -      | < 0.001   | 0.0011    | 0.0021    | 0.0028    | 0.001     |
| uranio                 | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | -                          | 0.002     | -      | < 0.001   | 0.001     | < 0.001   | -      | < 0.001   | 0.0011    | 0.0012    | 0.0012    | 0.0008    |
| zinc                   | mg/L     |                                                      | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | 0.002     | 0.003     | 0.003     | 0.002     |
| zirconio               | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |        |           |           |           |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | -                          | 0.3       | -      | 0.067     | 0.11      | 0.072     | -      | 3         | 0.093     | 0.27      | 0.41      | 0.07      |
| antimonio              | mg/L     | 0.005                                                | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | -                          | 0.016     | -      | 0.019     | 0.017     | 0.022     | -      | 0.021     | 0.022     | 0.025     | 0.012     | 0.021     |
| berilio                | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | -                          | < 0.05    | -      | < 0.05    | < 0.05    | < 0.05    | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | -                          | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.0002  | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | -                          | 2.22      | -      | 2.83      | 2.95      | 3.48      | -      | 2.52      | 3.69      | 4.12      | 1.16      | 2.97      |
| cromo                  | mg/L     | 0.05                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |



Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W13 |           |        |           |           |           |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|--------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07 | Dic-07    | Ene-08    | Mar-08    | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | 0.004     | -      | 0.002     | 0.002     | 0.001     | -      | 0.003     | 0.002     | 0.0023    | 0.0047    | 0.0019    |
| hierro    | mg/L     | 0.3                                                  | -                          | 0.57      | -      | 0.33      | 0.35      | 0.26      | -      | 0.54      | 0.48      | 0.63      | 0.37      | 0.43      |
| plomo     | mg/L     | 0.01                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | < 0.001   | -      | < 0.001   | 0.001     | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | 0.94      | -      | 1.01      | 1.18      | 1.58      | -      | 0.96      | 1.38      | 1.68      | 0.56      | 1.25      |
| manganeso | mg/L     | 0.1                                                  | -                          | 0.026     | -      | 0.007     | 0.012     | 0.005     | -      | 0.019     | 0.008     | 0.024     | 0.013     | 0.012     |
| mercurio  | mg/L     | 0.001                                                | -                          | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | 0.0003    | < 0.0001  | 0.0002    |
| níquel    | mg/L     | 0.02                                                 | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | < 0.15    | -      | < 0.15    | < 0.15    | < 0.15    | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | 1         | -      | 0.7       | 0.7       | 0.8       | -      | 0.8       | 0.8       | 0.9       | 0.55      | 0.72      |
| selenio   | mg/L     | 0.01                                                 | -                          | 0.001     | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | 5.2       | -      | 7.8       | 9.9       | 12        | -      | 7.2       | 10.4      | 12.9      | 4.98      | 8.74      |
| plata     | mg/L     | 0.05                                                 | -                          | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00025 | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | 3.22      | -      | 3.69      | 4.04      | 5.44      | -      | 3.58      | 4.66      | 5.6       | 2.01      | 4.37      |
| estroncio | mg/L     | 4.4                                                  | -                          | 0.023     | -      | 0.029     | 0.034     | 0.044     | -      | 0.028     | 0.042     | 0.05      | 0.013     | 0.036     |
| telurio   | mg/L     |                                                      | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | < 0.0001  | -      | < 0.0001  | < 0.0001  | < 0.0001  | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | < 0.001   | -      | < 0.001   | < 0.001   | < 0.001   | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | 0.006     | -      | 0.002     | 0.002     | 0.002     | -      | 0.007     | 0.002     | 0.0046    | 0.0067    | 0.0016    |
| uranio    | mg/L     | 0.02                                                 | -                          | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0005  | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | 0.002     | -      | < 0.001   | 0.001     | < 0.001   | -      | 0.002     | 0.001     | 0.002     | 0.002     | 0.001     |
| zinc      | mg/L     | 5                                                    | -                          | < 0.005   | -      | < 0.005   | < 0.005   | < 0.005   | -      | < 0.005   | < 0.005   | 0.004     | 0.001     | < 0.001   |
| zirconio  | mg/L     |                                                      | -                          | < 0.01    | -      | < 0.01    | < 0.01    | < 0.01    | -      | < 0.16    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

[illegible]

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.4       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 172       | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1.9       | 3.2       | 2.3       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 9         | 3         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 4,500     | 14,000    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 5,600     | 1,700     | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.006     | 0.14      | 0.027     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.025     | 0.011     | 0.02      |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.29      | 0.01      | 0.01      |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44.3      | 1.52      | 3.26      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | < 0.0002  | 0.0002    |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | 0.0039    | 0.0029    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0013    | 0.0035    | 0.0013    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.01    | 0.35      | 0.25      |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.012     | 0.0002    | 0.0004    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| magnesio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 130       | 1.31      | 2.48      |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.033     | 0.034     | 0.025     |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0014    | < 0.0001  | < 0.0001  |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0006    | 0.0004    |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 39.3      | 0.79      | 1.16      |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.1      | 4.81      | 7.86      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1030      | 8.27      | 15.7      |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.858     | 0.017     | 0.042     |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0006    | 0.0037    | 0.0006    |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0009    | 0.0012    | 0.0008    |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.001   | 0.002     | 0.001     |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |        |         |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.17      | 0.39      | 0.082     |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.026     | 0.014     | 0.02      |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.32      | 0.01      | 0.01      |
| cadmio          | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 44        | 1.62      | 3.17      |
| cromo           | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.0003    | 0.0002    |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W20 |        |        |        |        |        |        |        |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cobalto   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | 0.001     | < 0.0002  |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0018    | 0.0045    | 0.0016    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.46      | 0.81      | 0.37      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.013     | 0.0003    | 0.0004    |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 131       | 1.37      | 2.42      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.03      | 0.058     | 0.014     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0015    | < 0.0001  | 0.0003    |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0003    | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 39.8      | 0.76      | 1.13      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0008    | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 11.5      | 5.06      | 7.82      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 1030      | 8.06      | 16.1      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.881     | 0.02      | 0.041     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0028    | 0.0062    | 0.0021    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0002    | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.0016    | 0.0017    | 0.001     |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 0.001     | 0.003     | 0.001     |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | -      | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |        |        |          |                |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|----------|----------------|--------|
|                                                               |                                         |                                                      | Mínimo                     | Máximo | Media  | Promedio | Desv. Estándar | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |          |                |        |
| temperatura                                                   | °C                                      | ≤15                                                  | 22.8                       | 30.9   | 25.45  | 25.6341  | 1.69238        | 44     |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | 5.6                        | 7.7    | 7.24   | 6.6      | -              | 37     |
| conductividad                                                 | µS/cm                                   |                                                      | 20                         | 7,600  | 60     | 316.684  | 1222.14        | 38     |
| redox                                                         | mV                                      |                                                      | 32                         | 327    | 176    | 168.943  | 84.4947        | 35     |
| turbidez                                                      | NTU                                     | 1                                                    | 0.87                       | 23     | 3.265  | 4.90433  | 4.87369        | 30     |
| General Parámetros                                            |                                         |                                                      |                            |        |        |          |                |        |
| pH                                                            | Unidades de pH                          | 6.5 - 8.5                                            | 6.51                       | 7.85   | 7.38   | 7.17463  | -              | 45     |
| conductividad                                                 | µS/cm                                   |                                                      | 21                         | 6,730  | 52     | 202.3    | 995.425        | 45     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 4.7                        | 647    | 14.2   | 29.0344  | 94.5932        | 45     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 5.2                        | 649    | 14.5   | 29.0733  | 94.7942        | 45     |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 10                         | 3,660  | 48     | 127.767  | 538.819        | 45     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | <1                         | 45     | 3      | 7.2      | 10.1115        | 45     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 8                          | 54.4   | 21.2   | 21.7082  | 9.70846        | 45     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 9.8                        | 66.3   | 25.9   | 26.4878  | 11.8388        | 45     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | <0.5                       | <0.5   | -      | -        | -              | 45     |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | <0.5                       | <0.5   | -      | -        | -              | 45     |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |          |                |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | <0.01                      | 0.07   | <0.01  | 0.01489  | 0.01707        | 45     |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | <0.01                      | 0.24   | 0.06   | 0.07102  | 0.05027        | 44     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | <0.01                      | 0.24   | 0.05   | 0.06452  | 0.05198        | 31     |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | <0.002                     | 1      | <0.002 | 0.02356  | 0.14887        | 45     |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | <0.2                       | 1.7    | <0.2   | 0.21556  | 0.27712        | 45     |
| Aniones                                                       |                                         |                                                      |                            |        |        |          |                |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 1.84                       | 2,010  | 3.57   | 48.7951  | 299.029        | 45     |
| fluoruro                                                      | mg/L                                    | 1                                                    | <0.05                      | <0.5   | -      | -        | -              | 45     |
| sulfato                                                       | mg/L                                    | 250                                                  | <0.5                       | 257    | 0.96   | 6.84611  | 38.145         | 45     |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |           |          |          |                |        |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|-----------|----------|----------|----------------|--------|
|                                      |             |                                                      | Mínimo                     | Máximo    | Media    | Promedio | Desv. Estándar | Conteo |
| Orgánicos                            |             |                                                      |                            |           |          |          |                |        |
| nitrógeno orgánico total             | mg/L        |                                                      | <0.2                       | 100       | <0.2     | 2.48409  | 15.0455        | 44     |
| demanda química de oxígeno           | mg/L        |                                                      | <10                        | 10000     | 10       | 250.067  | 1487.24        | 45     |
| carbono orgánico disuelto            | mg/L como C |                                                      | 1.1                        | 2100      | 2.1      | 48.9878  | 312.698        | 45     |
| aceite y grasa totales               | mg/L        |                                                      | <2                         | 10        | <2       | 2.93182  | 2.66238        | 44     |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | <2                         | <2        | -        | -        | -              | 44     |
| fenoles totales                      | mg/L        | 0.001                                                | <0.001                     | 0.5       | <0.001   | 0.01461  | 0.07548        | 44     |
| coliformes totales                   | CFU/100mL   |                                                      | 1,300                      | 2,400,000 | 6,750    | 107,888  | 488251         | 24     |
| coliformes fecales                   | CFU/100mL   |                                                      | 500                        | 1,600,000 | 1,750    | 69,162.5 | 326077         | 24     |
| Especies de Cianuro                  |             |                                                      |                            |           |          |          |                |        |
| cianuro total                        | mg/L        | 0.001                                                | <0.002                     | <2        | -        | -        | -              | 45     |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | <0.002                     | <2        | -        | -        | -              | 45     |
| Metales Disueltos                    |             |                                                      |                            |           |          |          |                |        |
| aluminio                             | mg/L        |                                                      | <0.005                     | 0.2       | 0.031    | 0.05703  | 0.05746        | 45     |
| antimonio                            | mg/L        |                                                      | <0.0002                    | 0.0005    | 0.0002   | 0.00028  | 0.00019        | 45     |
| arsénico                             | mg/L        |                                                      | <0.0002                    | 0.0015    | <0.0002  | 0.0003   | 0.00027        | 45     |
| bario                                | mg/L        |                                                      | 0.006                      | 0.026     | 0.018    | 0.01649  | 0.00585        | 45     |
| berilio                              | mg/L        |                                                      | <0.0002                    | <0.001    | -        | -        | -              | 45     |
| bismuto                              | mg/L        |                                                      | <0.0002                    | <0.001    | -        | -        | -              | 45     |
| boro                                 | mg/L        |                                                      | <0.01                      | 0.29      | 0.01     | 0.02267  | 0.0459         | 45     |
| cadmio                               | mg/L        |                                                      | <0.00004                   | 0.00017   | <0.00004 | 5.8E-05  | 4.3E-05        | 45     |
| calcio                               | mg/L        |                                                      | 1.1                        | 44.3      | 3.26     | 4.20056  | 6.25362        | 45     |
| cromo                                | mg/L        |                                                      | <0.0002                    | 0.0014    | 0.0004   | 0.00035  | 0.00026        | 45     |
| cobalto                              | mg/L        |                                                      | <0.0002                    | 0.008     | 0.0006   | 0.00183  | 0.00217        | 45     |
| cobre                                | mg/L        |                                                      | <0.001                     | 0.005     | 0.002    | 0.00199  | 0.00101        | 45     |
| hierro                               | mg/L        |                                                      | <0.01                      | 0.37      | 0.21     | 0.20611  | 0.08593        | 45     |
| plomo                                | mg/L        |                                                      | <0.0002                    | <0.001    | -        | -        | -              | 45     |
| litio                                | mg/L        |                                                      | <0.0002                    | 0.012     | 0.0002   | 0.00057  | 0.00176        | 45     |
| magnesio                             | mg/L        |                                                      | 0.49                       | 130       | 1.4      | 4.503    | 19.1821        | 45     |
| manganeso                            | mg/L        |                                                      | 0.0008                     | 0.048     | 0.017    | 0.01775  | 0.01177        | 45     |
| mercurio                             | mg/L        |                                                      | <0.00002                   | <0.00002  | -        | -        | -              | 45     |

Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |          |          |                |        |
|------------------------|----------|------------------------------------------------------|----------------------------|----------|----------|----------|----------------|--------|
|                        |          |                                                      | Mínimo                     | Máximo   | Media    | Promedio | Desv. Estándar | Conteo |
| molibdeno              | ug/L     |                                                      | <0.0001                    | 0.0014   | 0.00025  | 0.0003   | 0.00025        | 45     |
| níquel                 | mg/L     |                                                      | <0.0002                    | 0.001    | 0.0005   | 0.00048  | 0.00025        | 45     |
| fósforo                | mg/L     |                                                      | <0.03                      | <0.15    | -        | -        | -              | 45     |
| potasio                | mg/L     |                                                      | 0.41                       | 39.3     | 0.71     | 1.55778  | 5.75656        | 45     |
| selenio                | mg/L     |                                                      | <0.0002                    | 0.002    | <0.0002  | 0.0003   | 0.00033        | 45     |
| sílice                 | mg/L     |                                                      | 4.1                        | 21.4     | 8.8      | 8.84778  | 3.23716        | 45     |
| plata                  | mg/L     |                                                      | <0.00005                   | <0.00025 | -        | -        | -              | 45     |
| sodio                  | mg/L     |                                                      | 1.95                       | 1030     | 3.94     | 27.046   | 152.925        | 45     |
| estroncio              | mg/L     |                                                      | 0.012                      | 0.858    | 0.033    | 0.05002  | 0.1237         | 45     |
| telurio                | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 45     |
| talio                  | mg/L     |                                                      | <0.00002                   | 0.00005  | <0.00002 | 2.8E-05  | 2E-05          | 45     |
| torio                  | mg/L     |                                                      | <0.0001                    | <0.0005  | -        | -        | -              | 45     |
| estaño                 | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 45     |
| titanio                | mg/L     |                                                      | <0.0004                    | 0.00715  | 0.0006   | 0.00135  | 0.00142        | 45     |
| uranio                 | mg/L     |                                                      | <0.0001                    | <0.0005  | -        | -        | -              | 45     |
| vanadio                | mg/L     |                                                      | <0.0005                    | 0.0021   | 0.0008   | 0.00094  | 0.00046        | 45     |
| zinc                   | mg/L     |                                                      | <0.001                     | 0.005    | 0.0025   | 0.00213  | 0.00095        | 45     |
| zirconio               | mg/L     |                                                      | <0.002                     | <0.01    | -        | -        | -              | 45     |
| <b>Metales Totales</b> |          |                                                      |                            |          |          |          |                |        |
| aluminio               | mg/L     | 0.2                                                  | 0.013                      | 3.7      | 0.11     | 0.31011  | 0.68479        | 45     |
| antimonio              | mg/L     | 0.005                                                | <0.0002                    | <0.001   | -        | -        | -              | 45     |
| arsénico               | mg/L     | 0.01                                                 | <0.0002                    | 0.0015   | <0.0002  | 0.00032  | 0.00027        | 45     |
| bario                  | mg/L     | 0.7                                                  | 0.0067                     | 0.033    | 0.019    | 0.01834  | 0.00567        | 45     |
| berilio                | mg/L     | 0.0146                                               | <0.0002                    | <0.001   | -        | -        | -              | 45     |
| bismuto                | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 45     |
| boro                   | mg/L     | 5                                                    | <0.01                      | 0.32     | 0.01     | 0.02478  | 0.04898        | 45     |
| cadmio                 | mg/L     | 0.003                                                | <0.00004                   | <0.0002  | -        | -        | -              | 45     |
| calcio                 | mg/L     |                                                      | 1.16                       | 44       | 3.23     | 4.21256  | 6.20169        | 45     |
| cromo                  | mg/L     | 0.05                                                 | <0.0002                    | 0.0017   | 0.0005   | 0.00038  | 0.0003         | 45     |
| cobalto                | mg/L     |                                                      | <0.0002                    | 0.001    | 0.0005   | 0.00033  | 0.00022        | 45     |
| cobre                  | mg/L     | 1                                                    | 0.001                      | 0.0097   | 0.002    | 0.00262  | 0.00173        | 45     |



Tabla 17      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río Caimito) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |         |          |          |                |        |
|-----------|----------|------------------------------------------------------|----------------------------|---------|----------|----------|----------------|--------|
|           |          |                                                      | Mínimo                     | Máximo  | Media    | Promedio | Desv. Estándar | Conteo |
| hierro    | mg/L     | 0.3                                                  | 0.11                       | 0.81    | 0.36     | 0.37389  | 0.14483        | 45     |
| plomo     | mg/L     | 0.01                                                 | <0.0002                    | 0.006   | 0.0003   | 0.00042  | 0.00087        | 45     |
| litio     | mg/L     | 0.0146                                               | <0.0002                    | 0.013   | 0.0004   | 0.00064  | 0.0019         | 45     |
| magnesio  | mg/L     |                                                      | 0.56                       | 131     | 1.38     | 4.50811  | 19.312         | 45     |
| manganeso | mg/L     | 0.1                                                  | 0.0029                     | 0.058   | 0.012    | 0.01506  | 0.01254        | 45     |
| mercurio  | mg/L     | 0.001                                                | <0.00002                   | 0.00002 | <0.00002 | <0.00002 | 1.5E-06        | 45     |
| molibdeno | mg/L     | 0.07                                                 | <0.0001                    | 0.0015  | 0.00025  | 0.00031  | 0.00025        | 45     |
| níquel    | mg/L     | 0.02                                                 | <0.0002                    | 0.0007  | 0.0005   | 0.00033  | 0.0002         | 45     |
| fósforo   | mg/L     | 0.000146                                             | <0.03                      | <0.15   | -        | -        | -              | 45     |
| potasio   | mg/L     |                                                      | 0.42                       | 39.8    | 0.7      | 1.56444  | 5.83151        | 45     |
| selenio   | mg/L     | 0.01                                                 | <0.0002                    | 0.003   | <0.0002  | 0.0004   | 0.00052        | 45     |
| sílice    | mg/L     |                                                      | 4.3                        | 16.8    | 8.84     | 8.90044  | 2.8372         | 45     |
| plata     | mg/L     | 0.05                                                 | <0.00005                   | 0.0005  | <0.00005 | 0.00008  | 8.1E-05        | 45     |
| sodio     | mg/L     | ≤ 200                                                | 1.97                       | 1030    | 4.06     | 27.086   | 152.918        | 45     |
| estroncio | mg/L     | 4.4                                                  | 0.013                      | 0.881   | 0.035    | 0.05109  | 0.12701        | 45     |
| telurio   | mg/L     |                                                      | <0.0002                    | <0.001  | -        | -        | -              | 45     |
| talio     | mg/L     |                                                      | <0.00001                   | <0.0001 | -        | -        | -              | 45     |
| torio     | mg/L     |                                                      | <0.0001                    | 0.0007  | <0.0001  | 0.00015  | 0.00013        | 45     |
| estaño    | mg/L     | 4.4                                                  | <0.0002                    | 0.002   | <0.0002  | 0.00032  | 0.00032        | 45     |
| titanio   | mg/L     |                                                      | <0.0006                    | 0.0075  | 0.002    | 0.00267  | 0.00228        | 45     |
| uranio    | mg/L     | 0.02                                                 | <0.0001                    | 0.00025 | <0.0001  | 0.00015  | 0.0001         | 45     |
| vanadio   | mg/L     |                                                      | <0.0006                    | 0.0025  | 0.001    | 0.00126  | 0.00062        | 45     |
| zinc      | mg/L     | 5                                                    | <0.001                     | 0.012   | 0.0025   | 0.00256  | 0.00213        | 45     |
| zirconio  | mg/L     |                                                      | <0.002                     | <0.21   | -        | -        | -              | 45     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la salud.

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce de Línea Base para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W17 |         |          |         |         |        |        |        |         |         |          |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|----------|---------|---------|--------|--------|--------|---------|---------|----------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07   | Dic-07  | Ene-08  | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08   | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 25.3                       | 25      | 24.5     | 23.5    | 24.5    | -      | -      | 25.4   | 26.3    | 29.3    | 23.8     | 25      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | 6.2     | 7.11     | 7.05    | 7.1     | -      | -      | -      | 7.19    | 7.2     | 7        | 7.5     |
| conductividad                                                 | μS/cm                                   |                                                      | 50                         | 60      | 50       | 50      | 60      | -      | -      | 61     | -       | 80      | 30       | 209     |
| redox                                                         | mV                                      |                                                      | 186                        | 180     | 201      | 176     | -       | -      | -      | 92     | -       | 264     | 244      | Na      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | 3.21     | 27.5    | -       | -      | -      | 0.57   | -       | 0.57    | 21.4     | 1.37    |
| General Parámetros                                            |                                         |                                                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.07                       | 7.66    | 6.962673 | 6.45    | 6.82    | -      | -      | 7.28   | 7.42    | 7.49    | 6.669885 | 7.35    |
| conductividad                                                 | μS/cm                                   |                                                      | 52                         | 67      | 46.5     | 43      | 58      | -      | -      | 61     | 59      | 64      | 25.5     | 53      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.5                       | 19      | 14.5     | 11      | 16      | -      | -      | 17     | 18      | 16.3    | 6.55     | 14.7    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 15.1                       | 19      | 13.1     | 11      | 15      | -      | -      | 18     | 17      | 18.1    | 6.85     | 14.3    |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | 51                         | 54      | 46.5     | 29      | 31      | -      | -      | 53     | 36      | 55      | 15.5     | 51      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | < 1                        | < 1     | 6.5      | 14      | 1       | -      | -      | < 1    | < 1     | < 1     | 12.5     | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 16.1                       | 20      | 14.35    | 12.4    | 21.6    | -      | -      | 15.9   | 19.4    | 21.8    | 7.5      | 18.8    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 19.7                       | 24.4    | 17.45    | 15.1    | 26.3    | -      | -      | 19.4   | 23.7    | 26.5    | 9.1      | 22.9    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                      | < 0.5   | < 0.5    | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5    | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                      | < 0.5   | < 0.5    | < 0.5   | < 0.5   | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5    | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                     | < 0.01  | < 0.01   | < 0.01  | < 0.01  | -      | -      | < 0.01 | < 0.01  | < 0.01  | 0.03     | 0.17    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.09                       | 0.07    | 0.11     | 0.23    | 0.07    | -      | -      | 0.05   | 0.06    | 0.05    | 0.155    | 0.05    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.09                       | 0.07    | 0.11     | 0.23    | 0.07    | -      | -      | 0.05   | 0.06    | -       | -        | 0.05    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                    | < 0.002 | < 0.002  | < 0.002 | < 0.002 | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002  | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                      | 0.2     | < 0.2    | 0.2     | < 0.2   | -      | -      | < 0.2  | < 0.2   | < 0.2   | < 0.2    | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |          |         |         |        |        |        |         |         |          |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 3.31                       | 3.71    | 3.265    | 3.38    | 3.95    | -      | -      | 3.7    | 3.87    | 3.73    | 2.1      | 4.09    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                     | < 0.05  | < 0.05   | < 0.05  | < 0.05  | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05   | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 5                          | 5.09    | 4.05     | 3.18    | 4.83    | -      | -      | 6.96   | 5.69    | 6.74    | 2.325    | 4.53    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W17 |          |           |          |          |        |        |          |          |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|-----------|----------|----------|--------|--------|----------|----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |           |          |          |        |        |          |          |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                      | 0.2      | < 0.2     | 0.2      | < 0.2    | -      | -      | < 0.2    | < 0.2    | < 0.2     | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | 32                         | 33       | < 20      | < 20     | 24       | -      | -      | 31       | < 20     | < 20      | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 1.3                        | < 1      | 1.2       | 2.3      | < 1      | -      | -      | 1.8      | 1.1      | 1.2       | 2.8      | 1.1       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                        | < 2      | < 2       | 5        | < 2      | -      | -      | 3        | < 2      | 3         | 3        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                        | < 2      | < 2       | < 2      | < 2      | -      | -      | < 2      | < 2      | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                    | 0.037    | < 0.001   | < 0.001  | < 0.001  | -      | -      | -        | < 0.001  | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -         | -        | -        | -      | -      | 1500     | 1800     | 5500      | 6400     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -         | -        | -        | -      | -      | 200      | 1200     | 1000      | 1400     | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |           |          |          |        |        |          |          |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                     | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                     | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |           |          |          |        |        |          |          |           |          |           |
| aluminio                             | mg/L        |                                                      | 0.076                      | 0.042    | 0.086     | 0.13     | 0.045    | -      | -      | 0.045    | 0.035    | 0.01      | 0.175    | 0.044     |
| antimonio                            | mg/L        |                                                      | 0.0002                     | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | 0.0002    |
| arsénico                             | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.016                      | 0.019    | 0.0145    | 0.015    | 0.018    | -      | -      | 0.017    | 0.018    | 0.017     | 0.00865  | 0.017     |
| berilio                              | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                     | < 0.05   | 0.02      | < 0.05   | < 0.05   | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                  | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | 0.00018  | < 0.00004 |
| calcio                               | mg/L        |                                                      | 4                          | 4.64     | 3.225     | 2.73     | 3.77     | -      | -      | 4.15     | 4.42     | 4.38      | 1.46     | 3.6       |
| cromo                                | mg/L        |                                                      | 0.0003                     | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0028                     | 0.002    | 0.0007    | 0.002    | 0.006    | -      | -      | < 0.001  | < 0.001  | 0.0009    | 0.00095  | 0.0045    |
| cobre                                | mg/L        |                                                      | 0.0049                     | 0.009    | 0.0115    | 0.011    | 0.007    | -      | -      | 0.01     | 0.013    | 0.0055    | 0.0145   | 0.014     |
| hierro                               | mg/L        |                                                      | 0.08                       | 0.1      | 0.095     | 0.19     | 0.11     | -      | -      | 0.06     | 0.1      | 0.06      | 0.19     | 0.09      |
| plomo                                | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002 | < 0.0002  |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W17 |           |           |           |           |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|-----------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| litio                  | mg/L     |                                                      | 0.0003                     | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| magnesio               | mg/L     |                                                      | 1.57                       | 1.78      | 1.555     | 1.06      | 1.55      | -      | -      | 1.56      | 1.79      | 1.31      | 0.695     | 1.38      |
| manganeso              | mg/L     |                                                      | 0.016                      | 0.012     | 0.0123    | 0.017     | 0.026     | -      | -      | 0.01      | 0.021     | 0.012     | 0.0115    | 0.022     |
| mercurio               | mg/L     |                                                      | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | 0.0006                     | 0.0007    | 0.00045   | < 0.0005  | 0.0007    | -      | -      | 0.001     | 0.0008    | 0.0008    | 0.0002    | 0.0004    |
| níquel                 | mg/L     |                                                      | 0.0005                     | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.0006    |
| fósforo                | mg/L     |                                                      | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | 0.67                       | 0.7       | 0.67      | 0.8       | 0.6       | -      | -      | 0.6       | 0.7       | 0.64      | 0.54      | 0.64      |
| selenio                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | 8.46                       | 9.4       | 6.4       | 4.9       | 7.8       | -      | -      | 7.7       | 8.6       | 8.52      | 4.065     | 6.81      |
| plata                  | mg/L     |                                                      | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | 4.01                       | 4.34      | 5.05      | 3         | 4.08      | -      | -      | 3.88      | 4.57      | 3.51      | 1.995     | 3.52      |
| estroncio              | mg/L     |                                                      | 0.031                      | 0.036     | 0.026     | 0.022     | 0.034     | -      | -      | 0.033     | 0.035     | 0.04      | 0.0125    | 0.03      |
| telurio                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | 0.0012                     | < 0.001   | 0.0017    | 0.003     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0003    | 0.00325   | 0.0006    |
| uranio                 | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | 0.0007                     | < 0.001   | 0.00055   | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0006    | 0.0007    | 0.0004    |
| zinc                   | mg/L     |                                                      | 0.003                      | < 0.005   | 0.0025    | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.0035    | 0.006     |
| zirconio               | mg/L     |                                                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |           |           |           |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | 0.13                       | 0.074     | -         | 0.19      | 0.13      | -      | -      | 0.49      | 0.058     | 0.042     | 0.335     | 0.065     |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | 0.014                      | 0.019     | 0.015     | 0.017     | 0.018     | -      | -      | 0.017     | 0.018     | 0.019     | 0.00985   | 0.017     |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | < 0.01                     | < 0.05    | < 0.01    | < 0.05    | < 0.05    | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W17 |           |           |           |           |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|-----------|-----------|-----------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cadmio    | mg/L     | 0.003                                                | < 0.00004                  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | 0.00017   | < 0.00004 |
| calcio    | mg/L     |                                                      | 3.4                        | 4.54      | 3.025     | 2.68      | 3.67      | -      | -      | 4.41      | 4.17      | 4.67      | 1.52      | 3.47      |
| cromo     | mg/L     | 0.05                                                 | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| cobalto   | mg/L     |                                                      | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre     | mg/L     | 1                                                    | 0.0074                     | 0.012     | 0.016     | 0.016     | 0.009     | -      | -      | 0.013     | 0.017     | 0.013     | 0.018     | 0.015     |
| hierro    | mg/L     | 0.3                                                  | 0.12                       | 0.16      | 0.21      | 0.27      | 0.22      | -      | -      | 0.14      | 0.16      | 0.15      | 0.3       | 0.13      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                     | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | -      | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio  | mg/L     |                                                      | 1.61                       | 1.74      | 1.34      | 1.08      | 1.52      | -      | -      | 1.64      | 1.5       | 1.56      | 0.74      | 1.37      |
| manganeso | mg/L     | 0.1                                                  | 0.009                      | 0.008     | 0.02      | 0.017     | 0.017     | -      | -      | 0.01      | 0.015     | 0.013     | 0.0114    | 0.014     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0005                     | 0.0007    | 0.0004    | < 0.0005  | 0.0007    | -      | -      | 0.0007    | 0.0006    | 0.0008    | 0.00025   | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.59                       | 0.7       | 0.615     | 0.8       | 0.6       | -      | -      | 0.7       | 0.6       | 0.63      | 0.57      | 0.58      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 7.87                       | 9.2       | 6.22      | 4.9       | 7.6       | -      | -      | 7.7       | 7.4       | 8.96      | 4.445     | 6.62      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 4.12                       | 4.28      | 3.275     | 3.14      | 4         | -      | -      | 4.03      | 4.03      | 3.97      | 2.11      | 3.35      |
| estroncio | mg/L     | 4.4                                                  | 0.028                      | 0.036     | 0.024     | 0.022     | 0.033     | -      | -      | 0.034     | 0.034     | 0.041     | 0.013     | 0.029     |
| telurio   | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0024                     | < 0.001   | 0.0018    | 0.002     | 0.001     | -      | -      | < 0.001   | < 0.001   | 0.0005    | 0.00575   | 0.0005    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0006                     | < 0.001   | 0.0008    | 0.001     | < 0.001   | -      | -      | < 0.001   | < 0.001   | 0.0006    | 0.00115   | 0.0004    |
| zinc      | mg/L     | 5                                                    | 0.001                      | < 0.005   | 0.003     | < 0.005   | < 0.005   | -      | -      | < 0.005   | < 0.005   | 0.002     | 0.0035    | 0.003     |
| zirconio  | mg/L     |                                                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | -      | < 0.02    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W5 |         |         |         |         |        |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|---------|---------|--------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08 | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 26.5                      | 26      | 24.2    | 25.2    | 24      | -      | 26.8    | 25.6   | 28.5    | 28.1    | 24.2    | 25.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 6.85    | 7.21    | 7.51    | 7.7     | -      | 7.67    | -      | 7.82    | 8.27    | 7.3     | 6.9     |
| conductividad                                                 | μS/cm                                   |                                                      | 50                        | 70      | 40      | 50      | 80      | -      | 68      | 70     | -       | 90      | 50      | 280     |
| redox                                                         | mV                                      |                                                      | 225                       | 184     | 181     | 177     | -       | -      | -       | 101    | -       | 283     | 189     | 70      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 11      | 61      | -       | -      | 4.74    | 5.88   | -       | 1.9     | 3.75    | 28.4    |
| General Parámetros                                            |                                         |                                                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.22                      | 7.53    | 6.94    | 6.59    | 7.54    | -      | 7.21    | 7.44   | 7.68    | 7.71    | 7.35    | 7.45    |
| conductividad                                                 | μS/cm                                   |                                                      | 50                        | 76      | 41      | 51      | 82      | -      | 64      | 68     | 72      | 80      | 44      | 56      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 22.1                      | 27      | 13      | 16      | 23      | -      | 21.8    | 22     | 24.7    | 26      | 13.2    | 16.9    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 17.8                      | 26      | 13.3    | 16      | 23      | -      | 20.4    | 23     | 25      | 30.1    | 13.8    | 17      |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | 67                        | 61      | 32      | 49      | 61      | -      | 64      | 63     | 63      | 59      | 38      | 50      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 6                         | 1       | 8       | 58      | < 1     | -      | 3       | 4      | < 1     | < 1     | 2       | 30      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 18.2                      | 25.8    | 13.6    | 16.6    | 26.9    | -      | 19.4    | 20.4   | 25.9    | 31.8    | 15      | 22.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 22.2                      | 31.5    | 16.6    | 20.3    | 32.8    | -      | 23.6    | 24.9   | 31.6    | 38.7    | 18.3    | 27.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | -      | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | -      | < 0.01  | < 0.01 | 0.02    | < 0.01  | < 0.01  | 0.01    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.16                      | 0.08    | 0.16    | 0.14    | 0.06    | -      | 0.11    | 0.07   | < 0.05  | 0.05    | 0.11    | 0.06    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.16                      | 0.08    | 0.16    | 0.14    | 0.06    | -      | 0.11    | 0.07   | < 0.05  | -       | -       | 0.06    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | -      | < 0.002 | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | 0.2                       | 0.2     | 0.2     | < 0.2   | < 0.2   | -      | < 0.2   | 0.2    | 0.2     | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |         |         |         |        |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.8                       | 3.59    | 2.62    | 3.43    | 3.8     | -      | 4.05    | 3.59   | 3.79    | 3.8     | 3.08    | 4.31    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | -      | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 3.6                       | 5.04    | 3.01    | 3.5     | 4.91    | -      | 5.21    | 5.97   | 5.64    | 6.7     | 3.1     | 3.26    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W5 |          |           |          |          |        |           |          |           |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|--------|-----------|----------|-----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08 | May-08    | Jun-08   | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |        |           |          |           |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | 0.2                       | 0.2      | 0.2       | < 0.2    | < 0.2    | -      | < 0.2     | 0.2      | < 0.2     | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                      | 23       | < 20      | < 20     | < 20     | -      | < 20      | 28       | < 20      | 90        | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 2.6                       | 1.5      | 2.5       | 1.9      | < 1      | -      | 1.3       | < 1      | 1.6       | 1.3       | 2.2       | 1.6       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | 2        | -      | < 2       | 4        | < 2       | 5         | 7         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | -      | < 2       | < 2      | < 2       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                   | 0.005    | < 0.001   | < 0.001  | < 0.001  | -      | 0.003     | < 0.001  | < 0.001   | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -      | -         | 3,100    | 1,100     | 12,000    | 5,900     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -      | -         | 1,000    | 500       | 3,600     | 600       | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |        |           |          |           |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | -      | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |        |           |          |           |           |           |           |
| aluminio                             | mg/L        |                                                      | 0.13                      | 0.049    | 0.18      | 0.18     | 0.035    | -      | 0.052     | 0.026    | 0.016     | 0.009     | 0.032     | 0.025     |
| antimonio                            | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | 0.0003    | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | 0.0003    | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.011                     | 0.012    | 0.0083    | 0.008    | 0.014    | -      | 0.012     | 0.01     | 0.012     | 0.014     | 0.0088    | 0.011     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | 0.01                      | < 0.05   | < 0.01    | < 0.05   | 0.06     | -      | < 0.01    | < 0.05   | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | -      | < 0.00004 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | 5.6                       | 6.1      | 2.74      | 3.6      | 5.06     | -      | 4.44      | 4.77     | 5.46      | 6.09      | 2.71      | 3.69      |
| cromo                                | mg/L        |                                                      | 0.0004                    | < 0.001  | 0.0004    | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | 0.0002    | 0.0003    |
| cobalto                              | mg/L        |                                                      | 0.0005                    | < 0.001  | 0.0004    | 0.004    | 0.001    | -      | 0.0016    | 0.002    | < 0.0002  | 0.0067    | 0.0002    | 0.0004    |
| cobre                                | mg/L        |                                                      | 0.005                     | 0.004    | 0.0063    | 0.005    | 0.006    | -      | 0.0038    | 0.004    | 0.0053    | 0.0032    | 0.0061    | 0.0049    |
| hierro                               | mg/L        |                                                      | 0.21                      | 0.21     | 0.21      | 0.26     | 0.15     | -      | 0.15      | 0.12     | 0.16      | 0.16      | 0.08      | 0.08      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | -      | < 0.0002  | 0.001    | 0.0002    | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio                             | mg/L        |                                                      | 1.96                      | 2.91     | 1.5       | 1.72     | 2.59     | -      | 2.06      | 2.35     | 2.7       | 2.62      | 1.57      | 1.86      |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W5 |              |             |             |              |        |             |            |              |              |             |             |
|------------------------|----------|------------------------------------------------------|---------------------------|--------------|-------------|-------------|--------------|--------|-------------|------------|--------------|--------------|-------------|-------------|
|                        |          |                                                      | Sept-07                   | Oct-07       | Nov-07      | Dic-07      | Ene-08       | Mar-08 | May-08      | Jun-08     | Sept-08      | Oct-08       | Nov-08      | Feb-09      |
| manganeso              | mg/L     |                                                      | 0.016                     | 0.016        | 0.019       | 0.027       | 0.019        | -      | 0.018       | 0.017      | 0.012        | 0.022        | 0.033       | 0.039       |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002    | < 0.00002   | < 0.00002   | < 0.00002    | -      | < 0.00002   | < 0.00002  | < 0.00002    | < 0.00002    | < 0.00002   | < 0.00002   |
| molibdeno              | ug/L     |                                                      | 0.0004                    | 0.0007       | 0.0003      | < 0.0005    | 0.0009       | -      | 0.0007      | 0.0006     | 0.0008       | 0.0009       | 0.0003      | 0.0004      |
| níquel                 | mg/L     |                                                      | < 0.0002                  | < 0.001      | 0.0002      | < 0.001     | < 0.001      | -      | 0.0004      | < 0.001    | < 0.0002     | 0.0008       | < 0.0002    | 0.0002      |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15       | < 0.03      | < 0.15      | < 0.15       | -      | < 0.03      | < 0.15     | < 0.03       | < 0.03       | < 0.03      | < 0.03      |
| potasio                | mg/L     |                                                      | 0.73                      | 0.8          | 0.61        | 0.7         | 0.6          | -      | 0.87        | 0.7        | 0.67         | 0.72         | 0.53        | 0.61        |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.0002     | < 0.0002     | < 0.0002    | < 0.0002    |
| sílice                 | mg/L     |                                                      | 7.51                      | 10.8         | 5.86        | 6.6         | 8.9          | -      | 8.31        | 8.2        | 9.17         | 10.6         | 7.66        | 6.7         |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025    | < 0.00005   | < 0.00025   | < 0.00025    | -      | < 0.00005   | < 0.00025  | < 0.00005    | < 0.00005    | < 0.00005   | < 0.00005   |
| sodio                  | mg/L     |                                                      | 3.46                      | 4.36         | 2.6         | 3.1         | 3.9          | -      | 3.97        | 3.75       | 4.14         | 4.03         | 2.86        | 3.22        |
| estroncio              | mg/L     |                                                      | 0.028                     | 0.041        | 0.019       | 0.023       | 0.037        | -      | 0.036       | 0.031      | 0.038        | 0.046        | 0.019       | 0.027       |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.0002     | < 0.0002     | < 0.0002    | < 0.0002    |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001     | < 0.00002   | < 0.0001    | < 0.0001     | -      | < 0.00002   | < 0.0001   | < 0.00002    | < 0.00002    | < 0.00002   | < 0.00002   |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005     | < 0.0001    | < 0.0005    | < 0.0005     | -      | < 0.0001    | < 0.0005   | < 0.0001     | < 0.0001     | < 0.0001    | < 0.0001    |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.0002     | < 0.0002     | < 0.0002    | < 0.0002    |
| titanio                | mg/L     |                                                      | 0.0033                    | < 0.001      | 0.0051      | 0.003       | < 0.001      | -      | 0.0021      | 0.001      | 0.0004       | 0.0005       | 0.0009      | 0.0009      |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005     | < 0.0001    | < 0.0005    | < 0.0005     | -      | < 0.0001    | < 0.0005   | < 0.0001     | < 0.0001     | < 0.0001    | < 0.0001    |
| vanadio                | mg/L     |                                                      | 0.0013                    | 0.001        | 0.0011      | 0.001       | < 0.001      | -      | 0.0019      | < 0.001    | 0.001        | 0.0014       | 0.0006      | 0.0007      |
| zinc                   | mg/L     |                                                      | 0.002                     | < 0.005      | 0.002       | < 0.005     | < 0.005      | -      | 0.002       | < 0.005    | 0.003        | < 0.001      | 0.003       | 0.001       |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01       | < 0.002     | < 0.01      | < 0.01       | -      | < 0.002     | < 0.01     | < 0.002      | < 0.002      | < 0.002     | < 0.002     |
| <b>Metales Totales</b> |          |                                                      |                           |              |             |             |              |        |             |            |              |              |             |             |
| aluminio               | mg/L     | 0.2                                                  | <b>0.27</b>               | <b>0.098</b> | <b>0.35</b> | <b>0.77</b> | <b>0.088</b> | -      | <b>0.15</b> | <b>1.2</b> | <b>0.026</b> | <b>0.027</b> | <b>0.07</b> | <b>0.31</b> |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002    |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002    |
| bario                  | mg/L     | 0.7                                                  | 0.0093                    | 0.013        | 0.01        | 0.017       | 0.013        | -      | 0.013       | 0.013      | 0.014        | 0.016        | 0.0092      | 0.015       |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002    |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | < 0.0002    | < 0.0002    |
| boro                   | mg/L     | 5                                                    | 0.01                      | < 0.05       | < 0.01      | < 0.05      | 0.06         | -      | < 0.01      | < 0.05     | < 0.05       | < 0.01       | < 0.01      | < 0.01      |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002     | < 0.00004   | < 0.0002    | < 0.0002     | -      | < 0.00004   | < 0.0002   | < 0.0002     | < 0.00004    | < 0.00004   | < 0.00004   |
| calcio                 | mg/L     |                                                      | 3.49                      | 5.82         | 2.87        | 3.44        | 5.09         | -      | 4.47        | 5.09       | 5.44         | 6.56         | 2.88        | 3.69        |
| cromo                  | mg/L     | 0.05                                                 | 0.0003                    | < 0.001      | 0.0005      | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | 0.0003      | 0.0004      |
| cobalto                | mg/L     |                                                      | < 0.0002                  | < 0.001      | < 0.0002    | < 0.001     | < 0.001      | -      | < 0.0002    | < 0.001    | < 0.001      | < 0.0002     | < 0.0002    | 0.0004      |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W5 |           |           |           |           |        |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|--------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08 | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | 0.0081                    | 0.005     | 0.0087    | 0.014     | 0.007     | -      | 0.0065    | 0.009     | 0.005     | 0.0049    | 0.0067    | 0.011     |
| hierro    | mg/L     | 0.3                                                  | 0.31                      | 0.31      | 0.35      | 0.65      | 0.25      | -      | 0.24      | 0.38      | 0.21      | 0.26      | 0.17      | 0.41      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0002                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | -      | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | 2.2                       | 2.78      | 1.5       | 1.72      | 2.59      | -      | 2.25      | 2.49      | 2.78      | 3.33      | 1.61      | 1.88      |
| manganeso | mg/L     | 0.1                                                  | 0.01                      | 0.014     | 0.019     | 0.05      | 0.017     | -      | 0.0099    | 0.018     | 0.004     | 0.0043    | 0.033     | 0.047     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | 0.0004                    | 0.0007    | 0.0004    | < 0.0005  | 0.0008    | -      | 0.0006    | 0.0007    | 0.0007    | 0.001     | 0.0003    | 0.0006    |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | 0.0002    | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | -      | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.66                      | 0.7       | 0.62      | 0.8       | 0.7       | -      | 0.81      | 0.7       | 0.7       | 0.75      | 0.57      | 0.63      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 7.63                      | 10.1      | 5.72      | 6.6       | 9.1       | -      | 8.18      | 8.6       | 9.4       | 12        | 8.02      | 6.78      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | -      | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 3.67                      | 4.17      | 2.58      | 3.26      | 3.95      | -      | 3.79      | 3.92      | 4.64      | 4.87      | 3         | 3.22      |
| estroncio | mg/L     | 4.4                                                  | 0.024                     | 0.039     | 0.019     | 0.024     | 0.036     | -      | 0.031     | 0.034     | 0.037     | 0.049     | 0.02      | 0.028     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | -      | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | -      | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0031                    | 0.001     | 0.0039    | 0.006     | 0.001     | -      | 0.0029    | 0.001     | < 0.001   | 0.0008    | 0.0013    | 0.0023    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | -      | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0014                    | 0.001     | 0.0014    | 0.003     | 0.001     | -      | 0.0012    | 0.001     | < 0.001   | 0.0014    | 0.0008    | 0.0013    |
| zinc      | mg/L     | 5                                                    | 0.002                     | < 0.005   | 0.002     | < 0.005   | < 0.005   | -      | 0.002     | < 0.005   | < 0.005   | 0.002     | 0.003     | 0.003     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | -      | < 0.002   | < 0.07    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                          | -      | -      | -      | -      | -      | -      | 26.4   | -       | 26.3    | 24.5    | 25      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | -      | -       | 7.4     | 6.93    | 7.46    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 69     | -       | 100     | 40      | 196     |
| redox                                                         | mV                                      |                                                      | -                          | -      | -      | -      | -      | -      | -      | 108    | -       | 261     | 223     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 6.76   | -       | 0.99    | 34      | 3.37    |
| General Parámetros                                            |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                          | -      | -      | -      | -      | -      | -      | 7.47   | -       | 7.71    | 6.86    | 7.57    |
| conductividad                                                 | μS/cm                                   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 67     | -       | 85      | 28      | 64      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 21     | -       | 26.2    | 8.5     | 20.2    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                          | -      | -      | -      | -      | -      | -      | 22     | -       | 28      | 8.6     | 20.5    |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | -                          | -      | -      | -      | -      | -      | -      | 61     | -       | 78      | 21      | 39      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4      | -       | < 1     | 33      | 2       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                          | -      | -      | -      | -      | -      | -      | 21.7   | -       | 36.2    | 10      | 27.5    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                          | -      | -      | -      | -      | -      | -      | 26.5   | -       | 44.2    | 12.2    | 33.5    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | -       | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.5  | -       | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01 | -       | < 0.01  | 0.02    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.08   | -       | 0.04    | 0.13    | 0.04    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                          | -      | -      | -      | -      | -      | -      | 0.08   | -       | -       | -       | 0.04    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | <0.002 | -       | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.2  | -       | 0.3     | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |        |        |        |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 3.64   | -       | 3.8     | 2.02    | 4.09    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05 | -       | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                          | -      | -      | -      | -      | -      | -      | 4.52   | -       | 5.46    | 1.8     | 3.3     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |          |         |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|----------|---------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.2    | -       | 0.3       | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 26       | -       | < 20      | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 1      | -       | 2.7       | 3.6       | 1.5       |
| aceite y grasa totales               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 5        | -       | 4         | < 2       | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 2      | -       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | -        | -       | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 5,000    | -       | 5,300     | 6,700     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2,700    | -       | 600       | 900       | -         |
| Especies de Cianuro                  |             |                                                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | -       | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01   | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |        |        |        |        |        |        |          |         |           |           |           |
| aluminio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.029    | -       | 0.005     | 0.14      | 0.021     |
| antimonio                            | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.011    | -       | 0.015     | 0.0065    | 0.012     |
| berilio                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.05   | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0002 | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4.73     | -       | 6.47      | 1.77      | 4.62      |
| cromo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | 0.0004    | 0.0003    |
| cobalto                              | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | 0.0004    | 0.0032    | 0.0031    |
| cobre                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.004    | -       | 0.0022    | 0.0074    | 0.0055    |
| hierro                               | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.1      | -       | 0.16      | 0.17      | 0.19      |
| plomo                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001  | -       | < 0.0002  | < 0.0002  | 0.0002    |
| magnesio                             | mg/L        |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2.24     | -       | 2.43      | 0.98      | 2.11      |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |           |         |           |           |           |
|-----------------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|---------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| manganeso       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.01      | -       | 0.01      | 0.026     | 0.031     |
| mercurio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | -       | 0.0008    | < 0.0001  | 0.0004    |
| níquel          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0007    | 0.0006    |
| fósforo         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.7       | -       | 0.7       | 0.5       | 0.59      |
| selenio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 8.2       | -       | 10        | 4.7       | 7.74      |
| plata           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 3.62      | -       | 3.85      | 2.02      | 3.56      |
| estroncio       | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.032     | -       | 0.051     | 0.013     | 0.034     |
| telurio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0001  | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | 0.0006    | 0.0031    | 0.0007    |
| uranio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | 0.0012    | 0.0009    | 0.0008    |
| zinc            | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.005   | -       | < 0.001   | 0.008     | 0.003     |
| zirconio        | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.01    | -       | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                            |        |        |        |        |        |        |           |         |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                          | -      | -      | -      | -      | -      | -      | 1.4       | -       | 0.016     | 0.4       | 0.066     |
| antimonio       | mg/L     | 0.005                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.013     | -       | 0.017     | 0.01      | 0.013     |
| berilio         | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | < 0.05    | -       | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.0002  | -       | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio          | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 4.87      | -       | 6.5       | 1.75      | 4.63      |
| cromo           | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0005    | 0.0002    |
| cobalto         | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0003    | < 0.0002  |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W22 |        |        |        |        |        |        |           |         |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|--------|--------|--------|--------|--------|--------|-----------|---------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07 | Nov-07 | Dic-07 | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08 | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | -                          | -      | -      | -      | -      | -      | -      | 0.006     | -       | 0.0029    | 0.011     | 0.0057    |
| hierro    | mg/L     | 0.3                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.31      | -       | 0.25      | 0.39      | 0.32      |
| plomo     | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 2.35      | -       | 2.85      | 1.02      | 2.18      |
| manganeso | mg/L     | 0.1                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.016     | -       | 0.0039    | 0.025     | 0.028     |
| mercurio  | mg/L     | 0.001                                                | -                          | -      | -      | -      | -      | -      | -      | < 0.00002 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                          | -      | -      | -      | -      | -      | -      | 0.0005    | -       | 0.0008    | < 0.0001  | 0.0004    |
| níquel    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | 0.0003    | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | -                          | -      | -      | -      | -      | -      | -      | < 0.15    | -       | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.7       | -       | 0.69      | 0.52      | 0.59      |
| selenio   | mg/L     | 0.01                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 8.1       | -       | 10.4      | 4.83      | 7.62      |
| plata     | mg/L     | 0.05                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.00025 | -       | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | -                          | -      | -      | -      | -      | -      | -      | 3.77      | -       | 4.31      | 2.03      | 3.48      |
| estroncio | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | 0.034     | -       | 0.05      | 0.013     | 0.034     |
| telurio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.00001 | -       | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | -                          | -      | -      | -      | -      | -      | -      | < 0.001   | -       | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.003     | -       | 0.0008    | 0.0042    | 0.0009    |
| uranio    | mg/L     | 0.02                                                 | -                          | -      | -      | -      | -      | -      | -      | < 0.0005  | -       | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | 0.001     | -       | 0.0011    | 0.0017    | 0.001     |
| zinc      | mg/L     | 5                                                    | -                          | -      | -      | -      | -      | -      | -      | 0.008     | -       | 0.001     | 0.002     | 0.002     |
| zirconio  | mg/L     |                                                      | -                          | -      | -      | -      | -      | -      | -      | < 0.08    | -       | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W18 |         |         |         |        |        |        |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|---------|---------|---------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                    | Oct-07  | Nov-07  | Dic-07  | Ene-08 | Mar-08 | May-08 | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                            |         |         |         |        |        |        |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 25                         | 27      | 24.6    | 24.1    | 24.5   | -      | -      | 25.3   | 26      | 27      | 24.7    | 23      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                        | -       | 7.1     | 7.39    | 7.4    | -      | -      | -      | 7.51    | 7.6     | 7.24    | 7.77    |
| conductividad                                                 | μS/cm                                   |                                                      | 50                         | 50      | 40      | 50      | 60     | -      | -      | 53     | -       | 60      | 40      | 198     |
| redox                                                         | mV                                      |                                                      | 210                        | 170     | 188     | 161     | -      | -      | -      | 106    | -       | 319     | 232     | NA      |
| turbidez                                                      | NTU                                     | 1                                                    | -                          | -       | -       | 3.88    | -      | -      | -      | 0.5    | -       | 0.95    | 4.34    | 0.57    |
| General Parámetros                                            |                                         |                                                      |                            |         |         |         |        |        |        |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.26                       | 7.43    | 6.71    | 6.62954 | -      | -      | -      | 7.38   | 7.54    | 7.53    | 7.24    | 7.52    |
| conductividad                                                 | μS/cm                                   |                                                      | 48                         | 53      | 36      | 48      | -      | -      | -      | 53     | 52      | 54      | 43      | 52      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.9                       | 18      | 11.1    | 14.5    | -      | -      | -      | 15     | 18      | 15.6    | 10.4    | 14.3    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.9                       | 17      | 11.1    | 14      | -      | -      | -      | 17     | 16      | 18.5    | 10.7    | 14.2    |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | 55                         | 51      | 36      | 38      | -      | -      | -      | 51     | 53      | 44      | 33      | 50      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | < 1                        | < 1     | 16      | < 1     | -      | -      | -      | < 1    | < 1     | 1       | 5       | < 1     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 21.2                       | 19.7    | 12.5    | 18.5    | -      | -      | -      | 18.7   | 21.2    | 24.6    | 15.7    | 23.1    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 25.9                       | 24      | 15.2    | 22.6    | -      | -      | -      | 22.8   | 25.8    | 30      | 19.2    | 28.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                      | < 0.5   | < 0.5   | < 0.5   | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                      | < 0.5   | < 0.5   | < 0.5   | -      | -      | -      | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                            |         |         |         |        |        |        |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                     | < 0.01  | < 0.01  | < 0.01  | -      | -      | -      | < 0.01 | < 0.01  | 0.01    | 0.05    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.11                       | 0.11    | 0.24    | 0.14    | -      | -      | -      | 0.08   | 0.08    | 0.11    | 0.18    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.11                       | 0.11    | 0.24    | 0.14    | -      | -      | -      | 0.08   | 0.08    | -       | -       | 0.08    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                    | < 0.002 | < 0.002 | < 0.002 | -      | -      | -      | <0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                      | < 0.2   | < 0.2   | < 0.2   | -      | -      | -      | 0.5    | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                            |         |         |         |        |        |        |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 3.17                       | 3.36    | 2.61    | 3.285   | -      | -      | -      | 3.37   | 3.55    | 3.46    | 2.81    | 3.68    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                     | < 0.05  | < 0.05  | < 0.05  | -      | -      | -      | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 2.14                       | 1.61    | 1.74    | 1.975   | -      | -      | -      | 2.28   | 2.18    | 2.08    | 1.8     | 2.09    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W18 |          |           |          |        |        |        |          |          |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|----------|-----------|----------|--------|--------|--------|----------|----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                    | Oct-07   | Nov-07    | Dic-07   | Ene-08 | Mar-08 | May-08 | Jun-08   | Sept-08  | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                            |          |           |          |        |        |        |          |          |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                      | < 0.2    | < 0.2     | < 0.2    | -      | -      | -      | 0.5      | < 0.2    | < 0.2     | < 0.2     | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                       | < 20     | < 20      | < 20     | -      | -      | -      | 23       | < 20     | 44        | < 20      | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | < 1                        | < 1      | 1.6       | < 1      | -      | -      | -      | 1.8      | < 1      | 3.1       | < 1       | < 1       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                        | < 2      | < 2       | < 2      | -      | -      | -      | 4        | < 2      | 8         | 3         | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                        | < 2      | < 2       | < 2      | -      | -      | -      | < 2      | < 2      | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | 0.003                      | 0.011    | < 0.001   | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                          | -        | -         | -        | -      | -      | -      | 4,100    | 2,200    | 2,700     | 4,000     | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                          | -        | -         | -        | -      | -      | -      | 1,600    | 1,500    | 600       | 1,000     | -         |
| Especies de Cianuro                  |             |                                                      |                            |          |           |          |        |        |        |          |          |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                     | < 0.01   | < 0.01    | < 0.01   | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                     | < 0.01   | < 0.01    | < 0.01   | -      | -      | -      | < 0.01   | < 0.01   | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                            |          |           |          |        |        |        |          |          |           |           |           |
| aluminio                             | mg/L        |                                                      | 0.008                      | 0.007    | 0.12      | 0.007    | -      | -      | -      | 0.009    | 0.014    | 0.002     | 0.045     | 0.006     |
| antimonio                            | mg/L        |                                                      | 0.0002                     | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.018                      | 0.015    | 0.013     | 0.017    | -      | -      | -      | 0.014    | 0.017    | 0.016     | 0.014     | 0.017     |
| berilio                              | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                     | < 0.05   | 0.01      | < 0.05   | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                  | < 0.0002 | < 0.00004 | < 0.0002 | -      | -      | -      | < 0.0002 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | 3.91                       | 3.98     | 2.52      | 3.4      | -      | -      | -      | 3.3      | 3.98     | 3.52      | 2.26      | 3.26      |
| cromo                                | mg/L        |                                                      | 0.0002                     | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0023                     | 0.005    | 0.0031    | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | 0.0024    | 0.0017    |
| cobre                                | mg/L        |                                                      | 0.0003                     | < 0.001  | 0.0014    | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | 0.0003    | 0.0009    | 0.0014    |
| hierro                               | mg/L        |                                                      | 0.02                       | < 0.05   | 0.14      | < 0.05   | -      | -      | -      | < 0.05   | < 0.05   | < 0.01    | 0.05      | 0.02      |
| plomo                                | mg/L        |                                                      | < 0.0002                   | < 0.001  | < 0.0002  | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  |
| litio                                | mg/L        |                                                      | 0.0002                     | < 0.001  | 0.0002    | < 0.001  | -      | -      | -      | < 0.001  | < 0.001  | < 0.0002  | < 0.0002  | 0.0003    |
| magnesio                             | mg/L        |                                                      | 1.73                       | 1.88     | 1.17      | 1.465    | -      | -      | -      | 1.58     | 1.97     | 1.65      | 1.16      | 1.48      |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W18 |           |           |           |        |        |        |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|----------------------------|-----------|-----------|-----------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| manganeso              | mg/L     |                                                      | 0.015                      | 0.023     | 0.018     | 0.0125    | -      | -      | -      | 0.016     | 0.016     | 0.0071    | 0.022     | 0.017     |
| mercurio               | mg/L     |                                                      | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | 0.0004                     | 0.002     | 0.0005    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.0003    |
| fósforo                | mg/L     |                                                      | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | 0.72                       | 0.7       | 0.67      | 0.7       | -      | -      | -      | 0.6       | 0.7       | 0.65      | 0.57      | 0.56      |
| selenio                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | 8.5                        | 8.8       | 5.03      | 6.6       | -      | -      | -      | 7         | 8.6       | 8.38      | 6.26      | 6.68      |
| plata                  | mg/L     |                                                      | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio                  | mg/L     |                                                      | 3.55                       | 3.9       | 3.34      | 3.2       | -      | -      | -      | 3.28      | 4.25      | 3.54      | 2.58      | 3.06      |
| estroncio              | mg/L     |                                                      | 0.031                      | 0.031     | 0.02      | 0.026     | -      | -      | -      | 0.026     | 0.032     | 0.032     | 0.019     | 0.028     |
| telurio                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | -      | -      | -      | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio                  | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | 0.0004                     | < 0.001   | 0.006     | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.0004    | 0.0016    | 0.0004    |
| uranio                 | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | 0.0009                     | < 0.001   | 0.0011    | < 0.001   | -      | -      | -      | < 0.001   | 0.001     | 0.001     | 0.0007    | 0.0006    |
| zinc                   | mg/L     |                                                      | 0.003                      | < 0.005   | 0.003     | < 0.005   | -      | -      | -      | < 0.005   | < 0.005   | < 0.001   | 0.002     | 0.002     |
| zirconio               | mg/L     |                                                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | -      | -      | -      | < 0.01    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                            |           |           |           |        |        |        |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | 0.02                       | 0.015     | 0.22      | 0.022     | -      | -      | -      | 0.12      | 0.014     | 0.009     | 0.12      | 0.012     |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | 0.016                      | 0.015     | 0.016     | 0.017     | -      | -      | -      | 0.017     | 0.017     | 0.018     | 0.014     | 0.017     |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | < 0.01                     | < 0.05    | < 0.01    | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                  | < 0.0002  | < 0.00004 | < 0.0002  | -      | -      | -      | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | 3.46                       | 3.74      | 2.52      | 3.155     | -      | -      | -      | 3.79      | 3.52      | 3.95      | 2.33      | 3.25      |
| cromo                  | mg/L     | 0.05                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto                | mg/L     |                                                      | < 0.0002                   | < 0.001   | 0.0002    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W18 |           |           |           |        |        |        |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|----------------------------|-----------|-----------|-----------|--------|--------|--------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                    | Oct-07    | Nov-07    | Dic-07    | Ene-08 | Mar-08 | May-08 | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | 0.0004                     | < 0.001   | 0.0018    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.0003    | 0.001     | 0.0003    |
| hierro    | mg/L     | 0.3                                                  | 0.05                       | < 0.05    | 0.26      | < 0.05    | -      | -      | -      | < 0.05    | < 0.05    | 0.04      | 0.11      | 0.03      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | 0.0004    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                     | < 0.001   | 0.0003    | < 0.001   | -      | -      | -      | 0.001     | < 0.001   | < 0.0002  | 0.0003    | 0.0002    |
| magnesio  | mg/L     |                                                      | 2.01                       | 1.78      | 1.18      | 1.405     | -      | -      | -      | 1.81      | 1.67      | 2.1       | 1.18      | 1.47      |
| manganeso | mg/L     | 0.1                                                  | 0.0074                     | 0.009     | 0.022     | 0.01      | -      | -      | -      | 0.018     | 0.004     | 0.0032    | 0.019     | 0.01      |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                  | < 0.00002 | < 0.00002 | < 0.00002 | -      | -      | -      | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                     | < 0.15    | < 0.03    | < 0.15    | -      | -      | -      | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.67                       | 0.7       | 0.65      | 0.65      | -      | -      | -      | 0.6       | 0.6       | 0.68      | 0.56      | 0.54      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 8.63                       | 8.2       | 5.03      | 6.3       | -      | -      | -      | 7.6       | 7.2       | 9.49      | 6.44      | 6.61      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                  | < 0.00025 | < 0.00005 | < 0.00025 | -      | -      | -      | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 4.04                       | 3.6       | 2.49      | 3.055     | -      | -      | -      | 3.74      | 3.8       | 4.16      | 2.57      | 3.02      |
| estroncio | mg/L     | 4.4                                                  | 0.029                      | 0.029     | 0.019     | 0.025     | -      | -      | -      | 0.029     | 0.029     | 0.034     | 0.019     | 0.028     |
| telurio   | mg/L     |                                                      | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                  | < 0.0001  | < 0.00002 | < 0.0001  | -      | -      | -      | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                   | < 0.001   | < 0.0002  | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0008                     | < 0.001   | 0.0079    | < 0.001   | -      | -      | -      | < 0.001   | 0.001     | 0.0005    | 0.0038    | 0.0004    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                   | < 0.0005  | < 0.0001  | < 0.0005  | -      | -      | -      | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0008                     | < 0.001   | 0.0016    | < 0.001   | -      | -      | -      | < 0.001   | < 0.001   | 0.001     | 0.0009    | 0.0006    |
| zinc      | mg/L     | 5                                                    | < 0.001                    | < 0.005   | 0.003     | < 0.005   | -      | -      | -      | < 0.005   | < 0.005   | 0.001     | 0.002     | < 0.001   |
| zirconio  | mg/L     |                                                      | < 0.002                    | < 0.01    | < 0.002   | < 0.01    | -      | -      | -      | < 0.04    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W8 |         |         |          |         |        |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|----------|---------|--------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07   | Ene-08  | Mar-08 | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |          |         |        |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | -                         | 27.1    | 24.2    | 24.4     | 22.5    | 24.4   | 25.7    | 26.5   | 30.3    | 27.6    | 25.3 C  | 24.9    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | -       | 7.12    | 7.34     | 7.3     | 7.21   | 6.79    | -      | 7.47    | 7.8     | 7.06    | 7.31    |
| conductividad                                                 | μS/cm                                   |                                                      | -                         | 60      | 40      | 60       | 70      | 62     | 58      | 60     | -       | 80      | 30      | 200     |
| redox                                                         | mV                                      |                                                      | -                         | 173     | 164     | 850-1150 | -       | 73     | -       | 104    | -       | 290     | 211     | 20      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 59.5    | 37.3     | -       | 23.2   | 2.79    | 4.28   | -       | 3.83    | 648     | 408     |
| General Parámetros                                            |                                         |                                                      |                           |         |         |          |         |        |         |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | -                         | 7.32    | 6.95    | 6.63     | 7.27    | 7.58   | 7.24    | 7.35   | 7.58    | 7.63    | 6.71    | 7.17    |
| conductividad                                                 | μS/cm                                   |                                                      | -                         | 50      | 43      | 54       | 62      | 72     | 58      | 61     | 62      | 71      | 27      | 48      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                         | 16      | 12.8    | 17       | 20      | 28.5   | 18.4    | 18     | 20.6    | 22.4    | 13      | 12.2    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | -                         | 16      | 12.9    | 16       | 19      | 30     | 17.6    | 20     | 24      | 25.4    | 6.4     | 29.5    |
| sólidos disueltos totales                                     | μS/cm                                   | 500                                                  | -                         | 49      | 42      | 25       | 31      | 59     | 70      | 51     | 72      | 57      | 61      | 96      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | -                         | 1       | 57      | 20       | 4       | 31     | 2       | < 1    | 75      | 2       | 1,470   | 1,610   |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | -                         | 16.1    | 14.2    | 19.2     | 20.3    | 27.55  | 18.8    | 19.1   | 23.8    | 30.1    | 7       | 15.1    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | -                         | 19.7    | 17.3    | 23.5     | 24.8    | 33.6   | 23      | 23.3   | 29.1    | 36.7    | 8.6     | 18.4    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | -                         | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | -                         | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5  | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |          |         |        |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | -                         | < 0.01  | < 0.01  | < 0.01   | < 0.01  | < 0.01 | 0.02    | < 0.01 | < 0.01  | < 0.01  | < 0.03  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | -                         | 0.08    | 0.13    | 0.09     | 0.07    | 0.06   | 0.1     | 0.06   | < 0.05  | 0.04    | 0.12    | 0.08    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | -                         | 0.05    | 0.13    | 0.09     | 0.07    | 0.06   | 0.1     | 0.06   | < 0.05  | -       | -       | 0.08    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | -                         | < 0.002 | < 0.002 | < 0.002  | < 0.002 | 0.003  | < 0.002 | <0.002 | 0.002   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | -                         | 0.2     | < 0.2   | < 0.2    | < 0.2   | 0.45   | < 0.2   | < 0.2  | < 0.2   | < 0.2   | 0.8     | 0.5     |
| Aniones                                                       |                                         |                                                      |                           |         |         |          |         |        |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | -                         | 2.79    | 3.23    | 3.66     | 3.97    | 4.245  | 4.22    | 3.72   | 3.97    | 3.88    | 2.53    | 4.73    |
| fluoruro                                                      | mg/L                                    | 1                                                    | -                         | < 0.05  | < 0.05  | < 0.05   | < 0.05  | < 0.05 | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | -                         | 4.34    | 2.86    | 3.09     | 3.06    | 3.62   | 3.79    | 3.92   | 3.68    | 3.59    | 2.84    | 4.11    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W8 |          |           |          |          |          |           |          |           |           |           |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|----------|-----------|----------|-----------|-----------|-----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08   | May-08    | Jun-08   | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |           |
| nitrógeno orgánico total             | mg/L        |                                                      | -                         | 0.2      | < 0.2     | < 0.2    | < 0.2    | 0.45     | < 0.2     | < 0.2    | < 0.2     | < 0.2     | 0.8       | 0.5       |
| demanda química de oxígeno           | mg/L        |                                                      | -                         | < 20     | < 20      | < 20     | < 20     | < 20     | < 20      | 28       | < 20      | 41        | 44        | 93        |
| carbono orgánico disuelto            | mg/L como C |                                                      | -                         | 2.3      | 1.4       | 1.6      | 2.1      | 1.35     | 1         | < 1      | 1.3       | 1.2       | 1.6       | 1.3       |
| aceite y grasa totales               | mg/L        |                                                      | -                         | < 2      | < 2       | < 2      | < 2      | 2.5      | < 2       | 2        | < 2       | 12        | 9         | 4         |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | -                         | < 2      | < 2       | < 2      | < 2      | < 2      | < 2       | < 2      | < 2       | < 2       | < 2       | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | -                         | 0.032    | < 0.001   | < 0.001  | < 0.001  | 0.023    | 0.004     | < 0.001  | < 0.001   | < 0.001   | < 0.001   | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 9,600    | 5,500     | 12,000    | 17,800    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 5,300    | 1,800     | 8,000     | 1,200     | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |           |
| cianuro total                        | mg/L        | 0.001                                                | -                         | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | -                         | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |           |
| aluminio                             | mg/L        |                                                      | -                         | 0.055    | 0.07      | 0.11     | 0.028    | 0.065    | 0.03      | 0.02     | 0.17      | 0.019     | 2.17      | 0.049     |
| antimonio                            | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | 0.0007    |
| arsénico                             | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                                | mg/L        |                                                      | -                         | 0.012    | 0.0073    | 0.01     | 0.011    | 0.012    | 0.011     | 0.01     | 0.0092    | 0.012     | 0.075     | 0.0052    |
| berilio                              | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                              | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                                 | mg/L        |                                                      | -                         | < 0.05   | < 0.01    | < 0.05   | < 0.05   | < 0.05   | < 0.01    | < 0.05   | < 0.01    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                               | mg/L        |                                                      | -                         | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                               | mg/L        |                                                      | -                         | 3.95     | 2.89      | 3.93     | 4.37     | 5.71     | 4.4       | 4.07     | 4.67      | 5.3       | 3.15      | 3.24      |
| cromo                                | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | 0.0005    | 0.0002    |
| cobalto                              | mg/L        |                                                      | -                         | 0.002    | 0.0006    | 0.002    | < 0.001  | < 0.001  | 0.0023    | < 0.001  | 0.0023    | 0.0019    | 0.0042    | 0.0044    |
| cobre                                | mg/L        |                                                      | -                         | < 0.001  | 0.0008    | < 0.001  | < 0.001  | 0.001    | 0.0007    | < 0.001  | 0.001     | 0.0004    | 0.0088    | 0.002     |
| hierro                               | mg/L        |                                                      | -                         | 0.14     | 0.11      | 0.24     | 0.13     | 0.075    | 0.12      | 0.12     | 0.19      | 0.11      | 1.13      | 0.08      |
| plomo                                | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | 0.0019    | 0.0004    |
| litio                                | mg/L        |                                                      | -                         | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | 0.0005    | < 0.0002  |
| magnesio                             | mg/L        |                                                      | -                         | 1.47     | 1.35      | 1.66     | 2.1      | 3.455    | 1.79      | 1.81     | 2.16      | 2.22      | 1.25      | 0.98      |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W8 |           |           |           |           |           |           |           |           |           |           |           |
|-----------------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| manganeso       | mg/L     |                                                      | -                         | 0.016     | 0.103     | 0.13      | 0.16      | 0.18      | 0.143     | 0.064     | 0.114     | 0.057     | 0.364     | 0.143     |
| mercurio        | mg/L     |                                                      | -                         | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | 0.0003    |
| níquel          | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0003    | < 0.001   | 0.0004    | 0.0003    | 0.0004    | 0.0007    |
| fósforo         | mg/L     |                                                      | -                         | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | -                         | 0.6       | 0.55      | 0.7       | 0.6       | 0.85      | 0.79      | 0.6       | 0.62      | 0.64      | 0.57      | 0.6       |
| selenio         | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | -                         | 6.8       | 5.41      | 5.8       | 6.6       | 9.1       | 6.39      | 6         | 7.37      | 7.5       | 5.64      | 4.66      |
| plata           | mg/L     |                                                      | -                         | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | -                         | 3.24      | 3.07      | 3.51      | 3.6       | 6.28      | 3.93      | 3.45      | 4.04      | 3.69      | 2.24      | 3.56      |
| estroncio       | mg/L     |                                                      | -                         | 0.03      | 0.017     | 0.023     | 0.028     | 0.042     | 0.028     | 0.024     | 0.027     | 0.035     | 0.025     | 0.019     |
| telurio         | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | -                         | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | -                         | 0.001     | 0.0016    | 0.002     | < 0.001   | < 0.001   | 0.0014    | < 0.001   | 0.0041    | 0.001     | 0.0013    | 0.0015    |
| uranio          | mg/L     |                                                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | -                         | < 0.001   | 0.0005    | < 0.001   | < 0.001   | < 0.001   | 0.0007    | < 0.001   | 0.001     | 0.0006    | 0.0044    | 0.0004    |
| zinc            | mg/L     |                                                      | -                         | < 0.005   | < 0.001   | < 0.005   | < 0.005   | < 0.005   | 0.002     | < 0.005   | 0.001     | < 0.001   | 0.007     | 0.002     |
| zirconio        | mg/L     |                                                      | -                         | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | -                         | 0.1       | 1.51      | 0.37      | 0.16      | 2.4       | 0.11      | 0.89      | 2.95      | 0.049     | 0.15      | 17.9      |
| antimonio       | mg/L     | 0.005                                                | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| bario           | mg/L     | 0.7                                                  | -                         | 0.013     | 0.018     | 0.013     | 0.012     | 0.0215    | 0.011     | 0.012     | 0.037     | 0.013     | 0.0038    | 0.152     |
| berilio         | mg/L     | 0.0146                                               | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| bismuto         | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | -                         | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | 0.1       | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | -                         | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | 0.00011   |
| calcio          | mg/L     |                                                      | -                         | 4.01      | 2.81      | 3.63      | 4.25      | 5.81      | 4.03      | 4.65      | 5.24      | 5.65      | 1.5       | 5.55      |
| cromo           | mg/L     | 0.05                                                 | -                         | < 0.001   | 0.0007    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | 0.0029    |
| cobalto         | mg/L     |                                                      | -                         | < 0.001   | 0.0008    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.003     | < 0.0002  | 0.0024    | 0.018     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W8 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | -                         | 0.001     | 0.0028    | 0.002     | < 0.001   | 0.0035    | 0.001     | 0.001     | 0.01      | 0.0006    | 0.0008    | 0.04      |
| hierro    | mg/L     | 0.3                                                  | -                         | 0.24      | 1.26      | 0.49      | 0.32      | 1.315     | 0.18      | 0.29      | 3.3       | 0.2       | 0.18      | 12.7      |
| plomo     | mg/L     | 0.01                                                 | -                         | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.004     | < 0.0002  | < 0.0002  | 0.0038    |
| litio     | mg/L     | 0.0146                                               | -                         | < 0.001   | 0.0005    | < 0.001   | < 0.001   | 0.001     | < 0.0002  | 0.001     | 0.002     | < 0.0002  | < 0.0002  | 0.0071    |
| magnesio  | mg/L     |                                                      | -                         | 1.51      | 1.44      | 1.6       | 2.07      | 3.76      | 1.82      | 2.12      | 2.74      | 2.75      | 0.63      | 3.8       |
| manganeso | mg/L     | 0.1                                                  | -                         | 0.01      | 0.119     | 0.13      | 0.15      | 0.185     | 0.108     | 0.08      | 0.22      | 0.025     | 0.084     | 1.09      |
| mercurio  | mg/L     | 0.001                                                | -                         | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0002    |
| níquel    | mg/L     | 0.02                                                 | -                         | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0004    | 0.0026    |
| fósforo   | mg/L     | 0.000146                                             | -                         | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | 0.15      |
| potasio   | mg/L     |                                                      | -                         | 0.7       | 0.84      | 0.7       | 0.6       | 1.1       | 0.78      | 0.7       | 1.1       | 0.66      | 0.52      | 1.6       |
| selenio   | mg/L     | 0.01                                                 | -                         | 0.001     | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | 0.0005    |
| sílice    | mg/L     |                                                      | -                         | 6.9       | 6.64      | 5.7       | 6.7       | 12.05     | 6.3       | 6.6       | 9.2       | 8.48      | 4.97      | 14.7      |
| plata     | mg/L     | 0.05                                                 | -                         | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | 0.00006   | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | 0.00008   |
| sodio     | mg/L     | ≤ 200                                                | -                         | 3.24      | 3         | 3.4       | 3.51      | 6.49      | 3.82      | 3.97      | 4.75      | 4.35      | 2.43      | 3.31      |
| estroncio | mg/L     | 4.4                                                  | -                         | 0.031     | 0.018     | 0.022     | 0.028     | 0.0435    | 0.025     | 0.027     | 0.032     | 0.036     | 0.0098    | 0.049     |
| telurio   | mg/L     |                                                      | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | -                         | < 0.0001  | 0.00002   | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | 0.00007   |
| torio     | mg/L     |                                                      | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0008    |
| estaño    | mg/L     | 4.4                                                  | -                         | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | -                         | 0.002     | 0.017     | 0.002     | 0.006     | 0.0375    | 0.0025    | 0.001     | 0.028     | 0.0021    | 0.0039    | 0.018     |
| uranio    | mg/L     | 0.02                                                 | -                         | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | 0.0002    |
| vanadio   | mg/L     |                                                      | -                         | < 0.001   | 0.0032    | < 0.001   | < 0.001   | < 0.001   | 0.0006    | < 0.001   | 0.008     | 0.0006    | 0.0007    | 0.024     |
| zinc      | mg/L     | 5                                                    | -                         | < 0.005   | 0.002     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | 0.023     | 0.002     | 0.002     | 0.046     |
| zirconio  | mg/L     |                                                      | -                         | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.03    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W4 |         |         |         |         |         |         |         |         |          |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08  | Sept-08 | Oct-08   | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 25.9                      | 27      | 24.5    | 24.2    | 23.5    | 25.4    | 25.8    | 26.4    | 28.2    | 27.4     | 25.1 C  | 25.2    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 5.9     | 7.1     | 7.34    | 7.3     | 8.01    | 6.8     | -       | 7.33    | 8        | 7.22    | 7       |
| conductividad                                                 | µS/cm                                   |                                                      | 50                        | 70      | 40      | 50      | 70      | 95      | 59      | 59      | -       | 80       | 40      | 215     |
| redox                                                         | mV                                      |                                                      | 214                       | 170     | 250     | 177     | -       | 67      | -       | 94      | -       | 290      | 227     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 54      | 9.31    | -       | 3.89    | 2.87    | 6.8     | -       | 2.34     | 4.09    | 60.7    |
| General Parámetros                                            |                                         |                                                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.22                      | 7.58    | 6.95    | 6.54    | 7.06    | 7.68    | 7.34    | 7.44954 | 7.53    | 7.664741 | 7.32    | 7.35    |
| conductividad                                                 | µS/cm                                   |                                                      | 50                        | 66      | 40      | 48      | 61      | 66      | 59      | 59      | 53      | 66       | 42      | 47      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.6                      | 23      | 12.3    | 14      | 17      | 24      | 19      | 17.5    | 16.3    | 19.9     | 10.5    | 13      |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 15.5                      | 22      | 12      | 14      | 17      | 25      | 17.8    | 19      | 17      | 22.55    | 12.2    | 15      |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 44                        | 45      | 32      | 35      | 45      | 56      | 72      | 50.5    | 54      | 43       | 32      | 24      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 4                         | 2       | 34      | 6       | 2       | 4       | 2       | 4       | 8       | 2.5      | 6       | 121     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 22.2                      | 27      | 15.9    | 19.5    | 41.3    | 27.4    | 22.3    | 21.3    | 21.2    | 32.15    | 16.4    | 20.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 27                        | 32.9    | 19.3    | 23.8    | 50.4    | 33.4    | 27.3    | 25.95   | 25.8    | 39.25    | 20      | 24.8    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5    | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | 0.02    | 0.01    | 0.02    | 0.02     | < 0.01  | 0.02    |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.08                      | < 0.05  | 0.16    | 0.12    | 0.06    | < 0.05  | 0.05    | 0.075   | 0.13    | 0.06     | 0.12    | 0.09    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.08                      | < 0.05  | 0.16    | 0.12    | 0.06    | < 0.05  | 0.05    | 0.075   | 0.13    | -        | -       | 0.09    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | <0.002  | < 0.002 | < 0.002  | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | 0.2                       | < 0.2   | 0.2     | < 0.2   | < 0.2   | 0.3     | < 0.2   | 0.5     | < 0.2   | 0.2      | < 0.2   | 0.4     |
| Aniones                                                       |                                         |                                                      |                           |         |         |         |         |         |         |         |         |          |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 3.04                      | 3.43    | 2.73    | 3.16    | 3.56    | 4.07    | 3.72    | 3.475   | 3.36    | 3.32     | 3.14    | 4.12    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05   | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 1.81                      | 1.36    | 1.29    | 1.3     | 1.41    | 1.63    | 1.82    | 1.84    | 2.36    | 1.615    | 1.22    | 1.56    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W4 |          |           |          |          |          |           |          |           |           |           |          |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|----------|-----------|----------|-----------|-----------|-----------|----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08   | May-08    | Jun-08   | Sept-08   | Oct-08    | Nov-08    | Feb-09   |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |          |
| nitrógeno orgánico total             | mg/L        |                                                      | 0.2                       | < 0.2    | 0.2       | < 0.2    | < 0.2    | 0.3      | < 0.2     | 0.5      | < 0.2     | 0.2       | < 0.2     | 0.4      |
| demanda química de oxígeno           | mg/L        |                                                      | 37                        | < 20     | < 20      | < 20     | 21       | < 20     | 20        | 31       | < 20      | 121.5     | < 20      | < 10     |
| carbono orgánico disuelto            | mg/L como C |                                                      | < 1                       | 1.3      | 2.1       | 1.3      | < 1      | < 1      | 1.2       | 3.25     | 1.9       | 1.25      | 1.7       | 1.1      |
| aceite y grasa totales               | mg/L        |                                                      | 3                         | < 2      | < 2       | < 2      | < 2      | 2        | < 2       | 4        | < 2       | 9.5       | < 2       | 3        |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | < 2      | < 2       | < 2      | < 2       | < 2       | < 2       | < 2      |
| fenoles totales                      | mg/L        | 0.001                                                | < 0.001                   | 0.007    | < 0.001   | < 0.001  | < 0.001  | < 0.001  | < 0.001   | < 0.001  | < 0.001   | < 0.001   | < 0.001   | < 0.001  |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 5200     | 10500     | 8650      | 10300     | -        |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 2650     | 3400      | 3900      | 700       | -        |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |          |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002  |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002   | < 0.002  |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |          |           |          |           |           |           |          |
| aluminio                             | mg/L        |                                                      | 0.074                     | 0.025    | 0.11      | 0.046    | 0.016    | 0.047    | 0.025     | 0.039    | 0.059     | 0.0125    | 0.077     | 0.069    |
| antimonio                            | mg/L        |                                                      | 0.0002                    | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | 0.0003   |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | 0.0004    | < 0.0002  | < 0.0002  | < 0.0002 |
| bario                                | mg/L        |                                                      | 0.015                     | 0.015    | 0.01      | 0.014    | 0.015    | 0.015    | 0.015     | 0.013    | 0.011     | 0.016     | 0.011     | 0.009    |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002 |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002 |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | < 0.01    | < 0.05   | < 0.05   | < 0.05   | < 0.01    | < 0.05   | < 0.01    | < 0.01    | < 0.01    | < 0.01   |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.00004 | < 0.00004 | < 0.00004 | 0.00005  |
| calcio                               | mg/L        |                                                      | 4.06                      | 5.57     | 2.99      | 3.37     | 4.1      | 4.93     | 4.78      | 4.24     | 3.81      | 4.97      | 2.44      | 3.22     |
| cromo                                | mg/L        |                                                      | 0.0003                    | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | 0.0007   |
| cobalto                              | mg/L        |                                                      | 0.0029                    | 0.003    | 0.0026    | < 0.001  | 0.006    | 0.001    | < 0.0002  | < 0.001  | 0.0006    | < 0.0002  | 0.0008    | 0.0064   |
| cobre                                | mg/L        |                                                      | 0.0005                    | < 0.001  | 0.001     | < 0.001  | < 0.001  | 0.001    | 0.0006    | < 0.001  | 0.0009    | 0.00045   | 0.0008    | 0.002    |
| hierro                               | mg/L        |                                                      | 0.16                      | 0.21     | 0.16      | 0.15     | 0.11     | 0.13     | 0.17      | 0.15     | 0.13      | 0.145     | 0.09      | 0.14     |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002  | 0.0036   |
| litio                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | 0.001    | 0.0002    | < 0.0002  | < 0.0002  | 0.0002   |
| magnesio                             | mg/L        |                                                      | 1.57                      | 2.16     | 1.18      | 1.29     | 1.65     | 2.86     | 1.73      | 1.655    | 1.66      | 1.81      | 1.06      | 1.21     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W4 |           |           |           |           |           |           |           |           |           |           |           |
|------------------------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                        |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| manganeso              | mg/L     |                                                      | 0.042                     | 0.058     | 0.036     | 0.035     | 0.046     | 0.038     | 0.0044    | 0.025     | 0.057     | 0.0096    | 0.066     | 0.059     |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno              | ug/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel                 | mg/L     |                                                      | 0.0004                    | < 0.001   | 0.0004    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | 0.0009    |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio                | mg/L     |                                                      | 0.75                      | 0.7       | 0.61      | 0.6       | 0.6       | 0.7       | 0.74      | 0.65      | 0.64      | 0.685     | 0.57      | 0.57      |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice                 | mg/L     |                                                      | 9.08                      | 10.9      | 6.8       | 6.8       | 8.5       | 12.7      | 8.61      | 7.65      | 6.54      | 10.25     | 8.37      | 6.55      |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | 0.00005   |
| sodio                  | mg/L     |                                                      | 4.22                      | 4.91      | 3.19      | 3.45      | 3.84      | 6.97      | 4.21      | 3.89      | 3.54      | 4.085     | 3.08      | 3.46      |
| estroncio              | mg/L     |                                                      | 0.033                     | 0.044     | 0.024     | 0.028     | 0.035     | 0.051     | 0.042     | 0.034     | 0.027     | 0.0455    | 0.022     | 0.027     |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | 0.00006   |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio                | mg/L     |                                                      | 0.0034                    | < 0.001   | 0.0058    | 0.002     | < 0.001   | < 0.001   | 0.002     | 0.001     | 0.0034    | 0.0015    | 0.0029    | 0.0027    |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio                | mg/L     |                                                      | 0.001                     | < 0.001   | 0.001     | < 0.001   | < 0.001   | < 0.001   | 0.0011    | < 0.001   | 0.0008    | 0.001     | 0.0008    | 0.0008    |
| zinc                   | mg/L     |                                                      | 0.002                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | < 0.001   | < 0.001   | < 0.001   | 0.003     |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| <b>Metales Totales</b> |          |                                                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio               | mg/L     | 0.2                                                  | 0.17                      | 0.054     | 0.66      | 0.14      | 0.05      | 0.26      | 0.06      | 1.25      | 0.16      | 0.0445    | 0.11      | 1.4       |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario                  | mg/L     | 0.7                                                  | 0.013                     | 0.015     | 0.017     | 0.014     | 0.014     | 0.016     | 0.015     | 0.0155    | 0.014     | 0.018     | 0.013     | 0.033     |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro                   | mg/L     | 5                                                    | < 0.01                    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.01    | < 0.01    | < 0.01    |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | < 0.00004 | < 0.00004 |
| calcio                 | mg/L     |                                                      | 3.46                      | 5.56      | 2.83      | 3.38      | 4.06      | 5.11      | 4.29      | 4.625     | 3.83      | 5.36      | 2.87      | 3.49      |
| cromo                  | mg/L     | 0.05                                                 | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| cobalto                | mg/L     |                                                      | < 0.0002                  | < 0.001   | 0.0004    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0018    |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W4 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | 0.0007                    | < 0.001   | 0.0026    | < 0.001   | < 0.001   | 0.001     | 0.0007    | 0.001     | 0.001     | 0.0005    | 0.0005    | 0.0061    |
| hierro    | mg/L     | 0.3                                                  | 0.25                      | 0.31      | 0.65      | 0.3       | 0.18      | 0.31      | 0.23      | 0.345     | 0.29      | 0.255     | 0.19      | 1.41      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0003    |
| litio     | mg/L     | 0.0146                                               | 0.0002                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | 0.001     | < 0.001   | < 0.0002  | < 0.0002  | 0.0007    |
| magnesio  | mg/L     |                                                      | 1.67                      | 2.07      | 1.19      | 1.3       | 1.68      | 2.92      | 1.73      | 1.79      | 1.69      | 2.22      | 1.23      | 1.52      |
| manganeso | mg/L     | 0.1                                                  | 0.022                     | 0.032     | 0.039     | 0.033     | 0.013     | 0.031     | 0.025     | 0.0315    | 0.034     | 0.0105    | 0.022     | 0.136     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | 0.0002    |
| fósforo   | mg/L     | 0.000146                                             | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.63                      | 0.7       | 0.64      | 0.6       | 0.6       | 0.9       | 0.74      | 0.7       | 0.7       | 0.705     | 0.55      | 0.71      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 8.88                      | 10.3      | 6.9       | 7         | 8.8       | 13        | 8.44      | 8.15      | 6.5       | 11.35     | 9.39      | 7.59      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 4.38                      | 4.66      | 3.03      | 3.45      | 3.88      | 7.29      | 4.27      | 4.15      | 3.87      | 4.85      | 3.46      | 3.37      |
| estroncio | mg/L     | 4.4                                                  | 0.03                      | 0.043     | 0.024     | 0.027     | 0.036     | 0.051     | 0.036     | 0.0365    | 0.027     | 0.0475    | 0.023     | 0.032     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0041                    | < 0.001   | 0.01      | 0.002     | 0.002     | 0.003     | 0.0023    | 0.004     | 0.002     | 0.00175   | 0.0041    | 0.01      |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.001                     | < 0.001   | 0.0022    | < 0.001   | < 0.001   | < 0.001   | 0.0008    | < 0.001   | 0.001     | 0.00105   | 0.0009    | 0.0039    |
| zinc      | mg/L     | 5                                                    | < 0.001                   | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | < 0.001   | 0.014     | < 0.005   | 0.0015    | 0.001     | 0.005     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.13    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W6 |         |         |         |         |         |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 26                        | 27      | 35.4    | 25.2    | 24      | 23.3    | 27.5    | 26.1   | 28      | 27      | 24.5°C  | 25.6    |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | -       | 7.14    | 7.3     | 7.3     | 6.52    | 6.7     | -      | 7.23    | 7.8     | 6.76    | 6.9     |
| conductividad                                                 | µS/cm                                   |                                                      | 50                        | 90      | 70      | -       | 110     | 46      | 125     | 64     | -       | 80      | 70      | 161     |
| redox                                                         | mV                                      |                                                      | 229                       | 165     | 203     | -       | -       | 68      | -       | 90     | -       | 280     | 161     | 90      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 16.6    | 12.8    | -       | 1.58    | 1.97    | 2.14   | -       | 1.54    | 5.08    | 9.4     |
| General Parámetros                                            |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.19                      | 7.3     | 6.9     | 6.53    | 6.96    | 7.48    | 7.47    | 7.24   | 7.35    | 7.4     | 7.18    | 7.33    |
| conductividad                                                 | µS/cm                                   |                                                      | 50                        | 50      | 39      | 45      | 71      | 67      | 78      | 55     | 44      | 57      | 63      | 51      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.4                      | 16      | 13.5    | 13      | 26      | 30      | 23.2    | 16     | 20.7    | 16      | 27.4    | 21.4    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 15.6                      | 18      | 11.1    | 13      | 22      | 26      | 22.2    | 16     | 28      | 18      | 19.7    | 14      |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 61                        | 41      | 33      | 27      | 62      | 56      | 73      | 39     | 49      | 46      | 32      | 49      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 14                        | < 1     | 10      | 10      | 2       | 1       | 4       | 2      | 13      | 3       | 5       | 13      |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 17.5                      | 15.7    | 13.2    | 14.9    | 27.5    | 23.7    | 27.1    | 14     | 15.3    | 20.4    | 27.7    | 17.4    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 21.3                      | 19.2    | 16.1    | 18.2    | 33.6    | 28.9    | 33      | 17.1   | 18.6    | 24.9    | 33.8    | 21.2    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01 | 0.04    | 0.01    | < 0.01  | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.06                      | < 0.05  | 0.12    | 0.07    | < 0.05  | < 0.05  | < 0.05  | < 0.05 | 0.23    | 0.06    | 0.11    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.06                      | < 0.05  | 0.12    | 0.07    | < 0.05  | < 0.05  | < 0.05  | < 0.05 | 0.23    | -       | -       | 0.07    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | <0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | < 0.2                     | 0.3     | < 0.2   | < 0.2   | < 0.2   | < 0.2   | < 0.2   | 0.6    | < 0.2   | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.83                      | 2.88    | 2.53    | 3.29    | 3.87    | 4.29    | 4.01    | 3.56   | 2.71    | 3.13    | 3       | 4.21    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | 0.18    | < 0.05  | < 0.05  | 0.06    | < 0.05  | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 4.19                      | 4.74    | 2.94    | 2.96    | 4.01    | 4.64    | 4.41    | 5.72   | 3.14    | 6.2     | 1.14    | 3.94    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W6 |          |           |          |          |          |           |          |           |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|----------|-----------|----------|-----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08   | May-08    | Jun-08   | Sept-08   | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | < 0.2                     | 0.3      | < 0.2     | < 0.2    | < 0.2    | < 0.2    | < 0.2     | 0.6      | < 0.2     | < 0.2     | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | < 20                      | < 20     | < 20      | < 20     | < 20     | < 20     | < 20      | 37       | < 20      | 47        | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 2.6                       | 1.8      | 3         | 1.9      | 1.1      | 1.3      | 1.2       | 4        | 2.5       | 4         | < 1      | 1.5       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | 3        | < 2       | 5        | < 2       | 4         | 2        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | < 2      | < 2       | < 2      | < 2       | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | 0.004                     | 0.01     | < 0.001   | < 0.001  | < 0.001  | < 0.001  | 0.005     | < 0.001  | < 0.001   | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 3,000    | 28,000    | 8,000     | 8,200    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 1,800    | 8,000     | 2,200     | 3,000    | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| aluminio                             | mg/L        |                                                      | 0.098                     | 0.058    | 0.13      | 0.071    | 0.018    | 0.026    | 0.03      | 0.042    | 0.06      | 0.015     | 0.053    | 0.028     |
| antimonio                            | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | 0.0006    |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | 0.0004    | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.014                     | 0.013    | 0.011     | 0.014    | 0.015    | 0.019    | 0.016     | 0.014    | 0.013     | 0.015     | 0.016    | 0.015     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | < 0.01    | < 0.05   | < 0.05   | 0.06     | < 0.01    | < 0.05   | 0.01      | < 0.01    | 0.03     | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.00004 | < 0.00004 | 0.00013  | < 0.00004 |
| calcio                               | mg/L        |                                                      | 4.22                      | 4.23     | 3.26      | 3.32     | 6.23     | 6.31     | 5.94      | 4.02     | 5.18      | 4.16      | 6.83     | 5.18      |
| cromo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0006                    | 0.004    | 0.0009    | < 0.001  | 0.005    | < 0.001  | 0.0013    | < 0.001  | 0.0004    | 0.0002    | 0.0011   | 0.0048    |
| cobre                                | mg/L        |                                                      | 0.0007                    | < 0.001  | 0.0008    | < 0.001  | < 0.001  | 0.001    | 0.0007    | 0.001    | 0.0012    | 0.0006    | 0.0011   | 0.0016    |
| hierro                               | mg/L        |                                                      | 0.15                      | 0.14     | 0.15      | 0.15     | 0.14     | 0.15     | 0.14      | 0.12     | 0.13      | 0.07      | 0.18     | 0.23      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | 0.0002   | < 0.0002  |
| magnesio                             | mg/L        |                                                      | 1.43                      | 1.42     | 1.3       | 1.14     | 2.48     | 3.39     | 2.02      | 1.4      | 1.88      | 1.36      | 2.51     | 2.06      |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W6 |             |             |             |               |             |              |           |             |              |                |             |
|------------------------|----------|------------------------------------------------------|---------------------------|-------------|-------------|-------------|---------------|-------------|--------------|-----------|-------------|--------------|----------------|-------------|
|                        |          |                                                      | Sept-07                   | Oct-07      | Nov-07      | Dic-07      | Ene-08        | Mar-08      | May-08       | Jun-08    | Sept-08     | Oct-08       | Nov-08         | Feb-09      |
| manganeso              | mg/L     |                                                      | 0.021                     | 0.022       | 0.027       | 0.018       | 0.053         | 0.032       | 0.03         | 0.015     | 0.01        | 0.011        | 0.09           | 0.09        |
| mercurio               | mg/L     |                                                      | < 0.00002                 | < 0.00002   | < 0.00002   | < 0.00002   | < 0.00002     | < 0.00002   | < 0.00002    | < 0.00002 | < 0.00002   | < 0.00002    | < 0.00002      | < 0.00002   |
| molibdeno              | ug/L     |                                                      | < 0.0001                  | < 0.0005    | < 0.0001    | < 0.0005    | < 0.0005      | < 0.0005    | < 0.0001     | < 0.0005  | < 0.0001    | < 0.0001     | < 0.0001       | < 0.0001    |
| níquel                 | mg/L     |                                                      | < 0.0002                  | < 0.001     | 0.0002      | < 0.001     | < 0.001       | < 0.001     | 0.0002       | < 0.001   | 0.0003      | < 0.0002     | 0.0003         | 0.0007      |
| fósforo                | mg/L     |                                                      | < 0.03                    | < 0.15      | < 0.03      | < 0.15      | < 0.15        | < 0.15      | < 0.03       | < 0.15    | < 0.03      | < 0.03       | < 0.03         | < 0.03      |
| potasio                | mg/L     |                                                      | 0.73                      | 0.6         | 0.55        | 0.7         | 0.6           | 0.8         | 0.79         | 0.7       | 0.77        | 0.7          | 0.71           | 0.78        |
| selenio                | mg/L     |                                                      | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | 0.003       | < 0.0002     | < 0.001   | < 0.0002    | < 0.0002     | < 0.0002       | < 0.0002    |
| sílice                 | mg/L     |                                                      | 7.09                      | 6.8         | 5.58        | 5.3         | 8.4           | 10.7        | 7.86         | 5.9       | 6.34        | 7.26         | 9.77           | 6.74        |
| plata                  | mg/L     |                                                      | < 0.00005                 | < 0.00025   | < 0.00005   | < 0.00025   | < 0.00025     | < 0.00025   | < 0.00005    | < 0.00025 | < 0.00005   | < 0.00005    | < 0.00005      | < 0.00005   |
| sodio                  | mg/L     |                                                      | 3.54                      | 3.29        | 2.71        | 3.02        | 4             | 6.86        | 4.18         | 3.41      | 3.52        | 3.15         | 4.62           | 3.79        |
| estroncio              | mg/L     |                                                      | 0.031                     | 0.03        | 0.026       | 0.026       | 0.047         | 0.058       | 0.049        | 0.031     | 0.037       | 0.035        | 0.042          | 0.04        |
| telurio                | mg/L     |                                                      | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.0002    | < 0.0002     | < 0.0002       | < 0.0002    |
| talio                  | mg/L     |                                                      | < 0.00002                 | < 0.0001    | < 0.00002   | < 0.0001    | < 0.0001      | < 0.0001    | < 0.00002    | < 0.0001  | < 0.00002   | < 0.00002    | < 0.00002      | < 0.00002   |
| torio                  | mg/L     |                                                      | < 0.0001                  | < 0.0005    | < 0.0001    | < 0.0005    | < 0.0005      | < 0.0005    | < 0.0001     | < 0.0005  | < 0.0001    | < 0.0001     | < 0.0001       | < 0.0001    |
| estaño                 | mg/L     |                                                      | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.0002    | < 0.0002     | < 0.0002       | < 0.0002    |
| titanio                | mg/L     |                                                      | 0.0043                    | 0.001       | 0.0051      | 0.002       | < 0.001       | < 0.001     | 0.0014       | < 0.001   | 0.0032      | 0.0009       | 0.0032         | 0.0018      |
| uranio                 | mg/L     |                                                      | < 0.0001                  | < 0.0005    | < 0.0001    | < 0.0005    | < 0.0005      | < 0.0005    | < 0.0001     | < 0.0005  | < 0.0001    | < 0.0001     | < 0.0001       | < 0.0001    |
| vanadio                | mg/L     |                                                      | 0.0013                    | < 0.001     | 0.0008      | < 0.001     | < 0.001       | < 0.001     | 0.0011       | < 0.001   | 0.0009      | 0.0007       | 0.001          | 0.0007      |
| zinc                   | mg/L     |                                                      | 0.001                     | < 0.005     | 0.001       | < 0.005     | < 0.005       | < 0.005     | 0.002        | < 0.005   | 0.008       | < 0.001      | 0.003          | 0.002       |
| zirconio               | mg/L     |                                                      | < 0.002                   | < 0.01      | < 0.002     | < 0.01      | < 0.01        | < 0.01      | < 0.002      | < 0.01    | < 0.002     | < 0.002      | < 0.002        | < 0.002     |
| <b>Metales Totales</b> |          |                                                      |                           |             |             |             |               |             |              |           |             |              |                |             |
| aluminio               | mg/L     | 0.2                                                  | <b>0.49</b>               | <b>0.11</b> | <b>0.41</b> | <b>0.18</b> | <b>0.052</b>  | <b>0.11</b> | <b>0.098</b> | <b>1</b>  | <b>0.11</b> | <b>0.044</b> | <b>0.25</b>    | <b>0.19</b> |
| antimonio              | mg/L     | 0.005                                                | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | < 0.0002       | < 0.0002    |
| arsénico               | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | < 0.0002       | < 0.0002    |
| bario                  | mg/L     | 0.7                                                  | 0.016                     | 0.013       | 0.014       | 0.014       | 0.014         | 0.019       | 0.016        | 0.016     | 0.013       | 0.016        | 0.014          | 0.017       |
| berilio                | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | < 0.0002       | < 0.0002    |
| bismuto                | mg/L     |                                                      | < 0.0002                  | < 0.001     | < 0.0002    | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | < 0.0002       | < 0.0002    |
| boro                   | mg/L     | 5                                                    | 0.01                      | < 0.05      | < 0.01      | < 0.05      | < 0.05        | < 0.05      | < 0.01       | < 0.05    | < 0.05      | < 0.01       | < 0.01         | < 0.01      |
| cadmio                 | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002    | < 0.00004   | < 0.0002    | <b>0.0002</b> | < 0.0002    | < 0.00004    | < 0.0002  | < 0.0002    | < 0.00004    | <b>0.00011</b> | < 0.00004   |
| calcio                 | mg/L     |                                                      | 3.55                      | 4.27        | 2.68        | 3.33        | 5.3           | 5.69        | 5.47         | 4.17      | 6.74        | 4.51         | 4.44           | 3.45        |
| cromo                  | mg/L     | 0.05                                                 | 0.0003                    | < 0.001     | 0.0002      | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | < 0.0002       | < 0.0002    |
| cobalto                | mg/L     |                                                      | 0.0004                    | < 0.001     | 0.0002      | < 0.001     | < 0.001       | < 0.001     | < 0.0002     | < 0.001   | < 0.001     | < 0.0002     | 0.0002         | 0.0002      |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W6 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| cobre     | mg/L     | 1                                                    | 0.0023                    | < 0.001   | 0.0016    | < 0.001   | 0.001     | < 0.001   | 0.001     | 0.001     | 0.001     | 0.0007    | 0.0012    | 0.0011    |
| hierro    | mg/L     | 0.3                                                  | 0.49                      | 0.24      | 0.43      | 0.34      | 0.2       | 0.24      | 0.2       | 0.23      | 0.23      | 0.12      | 0.38      | 0.31      |
| plomo     | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0003                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | 0.0002    | < 0.0002  |
| magnesio  | mg/L     |                                                      | 1.63                      | 1.67      | 1.07      | 1.13      | 2.2       | 2.89      | 2.07      | 1.44      | 2.82      | 1.64      | 2.08      | 1.32      |
| manganeso | mg/L     | 0.1                                                  | 0.02                      | 0.013     | 0.02      | 0.021     | 0.033     | 0.019     | 0.02      | 0.018     | 0.007     | 0.0025    | 0.044     | 0.024     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | 0.0006    | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | 0.0002                    | < 0.001   | 0.0002    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | 0.03                      | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.68                      | 0.7       | 0.56      | 0.7       | 0.6       | 0.8       | 0.74      | 0.7       | 0.8       | 0.71      | 0.61      | 0.65      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.003     | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 7.58                      | 7.3       | 5.16      | 5.3       | 7.6       | 10.1      | 7.93      | 6.1       | 8.4       | 7.77      | 8.92      | 6.01      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | 0.0003    | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 3.7                       | 3.38      | 2.54      | 2.96      | 3.63      | 6.56      | 5.36      | 3.45      | 4.44      | 3.72      | 3.47      | 3.29      |
| estroncio | mg/L     | 4.4                                                  | 0.028                     | 0.033     | 0.022     | 0.025     | 0.042     | 0.052     | 0.041     | 0.031     | 0.047     | 0.037     | 0.033     | 0.029     |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | 0.0004    | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.0081                    | 0.002     | 0.013     | 0.003     | 0.001     | 0.003     | 0.0018    | 0.002     | 0.002     | 0.0009    | 0.012     | 0.0025    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0022                    | < 0.001   | 0.0014    | 0.001     | 0.001     | < 0.001   | 0.0009    | < 0.001   | 0.001     | 0.0007    | 0.0014    | 0.001     |
| zinc      | mg/L     | 5                                                    | 0.001                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.001     | < 0.005   | < 0.005   | 0.002     | 0.001     | 0.001     |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.18    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W7 |         |         |         |         |         |         |        |         |         |         |         |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|---------------------------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|
|                                                               |                                         |                                                      | Sept-07                   | Oct-07  | Nov-07  | Dic-07  | Ene-08  | Mar-08  | May-08  | Jun-08 | Sept-08 | Oct-08  | Nov-08  | Feb-09  |
| Parámetros de Campo                                           |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| temperatura                                                   | °C                                      | ≤15                                                  | 25.9                      | 25.5    | 24.6    | 25.2    | 25      | 25      | 27.1    | 26.2   | 26.9    | 27.4    | 23.9°C  | 24      |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | n/a                       | 5.3     | 7.2     | 7.48    | 7.6     | 7.23    | 6.88    | -      | 7.36    | 8.1     | 6.75    | 6.71    |
| conductividad                                                 | µS/cm                                   |                                                      | 50                        | 50      | 40      | -       | 60      | 31      | 60      | 55     | -       | 70      | 30      | 245     |
| redox                                                         | mV                                      |                                                      | 188                       | 158     | 220     | -       | -       | 65      | -       | 91     | -       | 292     | 215     | 60      |
| turbidez                                                      | NTU                                     | 1                                                    | -                         | -       | 17.7    | 7.08    | -       | 1.14    | 1.82    | 26.3   | -       | 2.15    | 10.06   | 5.44    |
| General Parámetros                                            |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 7.26                      | 7.43    | 6.99    | 6.56    | 7.27    | 7.54    | 7.25    | 7.27   | 7.29    | 7.53    | 6.80954 | 7.37    |
| conductividad                                                 | µS/cm                                   |                                                      | 49                        | 59      | 39      | 46      | 62      | 64      | 61      | 55     | 44      | 65      | 29.5    | 52      |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 14.8                      | 20      | 10.9    | 14      | 16      | 24      | 19.2    | 16     | 13.3    | 18.7    | 8.2     | 14.6    |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 16.7                      | 20      | 11      | 13      | 16      | 24      | 17.3    | 16     | 14      | 20.7    | 8.35    | 14.5    |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 56                        | 53      | 35      | 29      | 35      | 52      | 62      | 35     | 41      | 54      | 22      | 44      |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | 71                        | 21      | 15      | 3       | < 1     | < 1     | 3       | 2      | 25      | < 1     | 12      | 9       |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 18                        | 19.7    | 13.7    | 15.4    | 19.2    | 22      | 18.1    | 14.8   | 15.2    | 22      | 9.05    | 18.3    |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 21.9                      | 24      | 16.7    | 18.8    | 23.4    | 26.8    | 22.1    | 18     | 18.5    | 26.9    | 11      | 22.3    |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | < 0.5                     | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5   | < 0.5  | < 0.5   | < 0.5   | < 0.5   | < 0.5   |
| Nutrientes                                                    |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | < 0.01                    | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | < 0.01  | 0.01   | 0.08    | < 0.01  | 0.03    | < 0.01  |
| nitrato y nitrito (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | 0.07                      | 0.15    | 0.13    | 0.06    | 0.05    | < 0.05  | < 0.05  | < 0.05 | 0.23    | 0.05    | 0.13    | 0.07    |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | 0.07                      | 0.15    | 0.13    | 0.06    | 0.05    | < 0.05  | < 0.05  | < 0.05 | 0.23    | -       | -       | 0.07    |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | < 0.002                   | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | < 0.002 | <0.002 | 0.003   | < 0.002 | < 0.002 | < 0.002 |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | 0.4                       | 0.3     | < 0.2   | < 0.2   | < 0.2   | 0.2     | < 0.2   | 0.2    | 0.3     | < 0.2   | < 0.2   | < 0.2   |
| Aniones                                                       |                                         |                                                      |                           |         |         |         |         |         |         |        |         |         |         |         |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.72                      | 3.58    | 2.45    | 3.34    | 3.95    | 4.3     | 4.12    | 3.6    | 2.68    | 3.24    | 2.125   | 4.21    |
| fluoruro                                                      | mg/L                                    | 1                                                    | < 0.05                    | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05  | < 0.05 | < 0.05  | < 0.05  | < 0.05  | < 0.05  |
| sulfato                                                       | mg/L                                    | 250                                                  | 3.79                      | 3.69    | 2.76    | 2.97    | 4.49    | 4.68    | 5.29    | 5.05   | 2.82    | 7.34    | 2.95    | 3.74    |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W7 |          |           |          |          |          |           |          |           |           |          |           |
|--------------------------------------|-------------|------------------------------------------------------|---------------------------|----------|-----------|----------|----------|----------|-----------|----------|-----------|-----------|----------|-----------|
|                                      |             |                                                      | Sept-07                   | Oct-07   | Nov-07    | Dic-07   | Ene-08   | Mar-08   | May-08    | Jun-08   | Sept-08   | Oct-08    | Nov-08   | Feb-09    |
| Orgánicos                            |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| nitrógeno orgánico total             | mg/L        |                                                      | 0.4                       | 0.3      | < 0.2     | < 0.2    | < 0.2    | 0.2      | < 0.2     | 0.2      | 0.2       | < 0.2     | < 0.2    | < 0.2     |
| demanda química de oxígeno           | mg/L        |                                                      | 40                        | < 20     | < 20      | < 20     | 78       | < 20     | < 20      | 26       | < 20      | 148       | < 20     | < 10      |
| carbono orgánico disuelto            | mg/L como C |                                                      | 2.7                       | 2.3      | 2.2       | 2        | 1.2      | 1.6      | 1.3       | 4.4      | 3.3       | 2.1       | 2.25     | 1.2       |
| aceite y grasa totales               | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | 3        | 3        | < 2       | 3        | < 2       | 5         | 3        | < 2       |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | < 2                       | < 2      | < 2       | < 2      | < 2      | < 2      | < 2       | < 2      | < 2       | < 2       | < 2      | < 2       |
| fenoles totales                      | mg/L        | 0.001                                                | 0.047                     | 0.021    | < 0.001   | < 0.001  | < 0.001  | < 0.001  | 0.001     | < 0.001  | < 0.001   | < 0.001   | < 0.001  | < 0.001   |
| coliformes totales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 3,100    | 14,000    | 9,000     | 8,600    | -         |
| coliformes fecales                   | CFU/100mL   |                                                      | -                         | -        | -         | -        | -        | -        | -         | 1,600    | 10,000    | 2,900     | 2,650    | -         |
| Especies de Cianuro                  |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| cianuro total                        | mg/L        | 0.001                                                | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | < 0.01                    | < 0.01   | < 0.01    | < 0.01   | < 0.01   | < 0.01   | < 0.01    | < 0.01   | < 0.01    | < 0.002   | < 0.002  | < 0.002   |
| Metales Disueltos                    |             |                                                      |                           |          |           |          |          |          |           |          |           |           |          |           |
| aluminio                             | mg/L        |                                                      | 0.12                      | 0.1      | 0.16      | 0.048    | 0.028    | 0.13     | 0.04      | 0.045    | 0.14      | 0.02      | 0.145    | 0.038     |
| antimonio                            | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| arsénico                             | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bario                                | mg/L        |                                                      | 0.014                     | 0.009    | 0.01      | 0.014    | 0.014    | 0.017    | 0.016     | 0.014    | 0.011     | 0.015     | 0.0099   | 0.014     |
| berilio                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| bismuto                              | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| boro                                 | mg/L        |                                                      | < 0.01                    | < 0.05   | < 0.01    | < 0.05   | < 0.05   | < 0.05   | < 0.01    | < 0.05   | < 0.01    | < 0.01    | < 0.01   | < 0.01    |
| cadmio                               | mg/L        |                                                      | < 0.00004                 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.00004 | < 0.0002 | < 0.00004 | < 0.00004 | 0.00013  | < 0.00004 |
| calcio                               | mg/L        |                                                      | 3.66                      | 4.67     | 2.66      | 3.41     | 3.9      | 5.19     | 4.98      | 4.06     | 3.21      | 4.86      | 1.97     | 3.64      |
| cromo                                | mg/L        |                                                      | 0.0002                    | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| cobalto                              | mg/L        |                                                      | 0.0007                    | 0.002    | 0.0026    | < 0.001  | 0.002    | 0.001    | < 0.0002  | < 0.001  | 0.0005    | < 0.0002  | 0.00325  | 0.003     |
| cobre                                | mg/L        |                                                      | 0.0015                    | < 0.001  | 0.0015    | < 0.001  | < 0.001  | 0.004    | 0.0009    | 0.001    | 0.0015    | 0.0007    | 0.00185  | 0.0017    |
| hierro                               | mg/L        |                                                      | 0.19                      | 0.18     | 0.18      | 0.14     | 0.09     | 0.11     | 0.15      | 0.14     | 0.18      | 0.09      | 0.145    | 0.11      |
| plomo                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| litio                                | mg/L        |                                                      | < 0.0002                  | < 0.001  | < 0.0002  | < 0.001  | < 0.001  | < 0.001  | < 0.0002  | < 0.001  | < 0.0002  | < 0.0002  | < 0.0002 | < 0.0002  |
| magnesio                             | mg/L        |                                                      | 1.38                      | 1.96     | 1.04      | 1.21     | 1.59     | 2.61     | 1.64      | 1.44     | 1.29      | 1.6       | 0.79     | 1.34      |
| manganeso                            | mg/L        |                                                      | 0.057                     | 0.15     | 0.019     | 0.013    | 0.014    | 0.012    | 0.018     | 0.013    | 0.0061    | 0.009     | 0.028    | 0.022     |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro       | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W7 |           |           |           |           |           |           |           |           |           |           |           |
|-----------------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|                 |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| mercurio        | mg/L     |                                                      | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno       | ug/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel          | mg/L     |                                                      | < 0.0002                  | < 0.001   | 0.0005    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.0003    | < 0.0002  | 0.0006    | 0.0005    |
| fósforo         | mg/L     |                                                      | < 0.03                    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.03    | < 0.03    | < 0.03    | < 0.03    |
| potasio         | mg/L     |                                                      | 0.72                      | 0.8       | 0.55      | 0.7       | 0.6       | 0.8       | 0.83      | 0.7       | 0.75      | 0.71      | 0.53      | 0.66      |
| selenio         | mg/L     |                                                      | < 0.0002                  | 0.001     | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice          | mg/L     |                                                      | 7.21                      | 7.1       | 5.11      | 5.6       | 6.7       | 9.4       | 6.96      | 6.1       | 5.3       | 7.51      | 5.045     | 6.14      |
| plata           | mg/L     |                                                      | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio           | mg/L     |                                                      | 3.26                      | 3.84      | 2.49      | 3.29      | 3.55      | 6.27      | 3.86      | 3.45      | 2.74      | 3.25      | 2.21      | 3.31      |
| estroncio       | mg/L     |                                                      | 0.028                     | 0.026     | 0.02      | 0.026     | 0.032     | 0.049     | 0.042     | 0.03      | 0.026     | 0.041     | 0.016     | 0.029     |
| telurio         | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| talio           | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | < 0.0001  | < 0.0001  | < 0.00002 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| torio           | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño          | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio         | mg/L     |                                                      | 0.0048                    | 0.003     | 0.0063    | 0.002     | < 0.001   | < 0.001   | 0.0017    | < 0.001   | 0.0073    | 0.001     | 0.00525   | 0.0008    |
| uranio          | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio         | mg/L     |                                                      | 0.0013                    | < 0.001   | 0.0009    | < 0.001   | < 0.001   | < 0.001   | 0.001     | < 0.001   | 0.001     | 0.0008    | 0.00075   | 0.0006    |
| zinc            | mg/L     |                                                      | 0.002                     | < 0.005   | 0.001     | < 0.005   | 0.012     | < 0.005   | 0.002     | < 0.005   | 0.002     | < 0.001   | 0.0015    | 0.002     |
| zirconio        | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.01    | < 0.002   | < 0.002   | < 0.002   | < 0.002   |
| Metales Totales |          |                                                      |                           |           |           |           |           |           |           |           |           |           |           |           |
| aluminio        | mg/L     | 0.2                                                  | 1.11                      | 0.33      | 0.49      | 0.098     | 0.072     | 0.09      | 0.099     | 1.1       | 0.53      | 0.073     | 0.295     | 0.13      |
| antimonio       | mg/L     | 0.005                                                | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| arsénico        | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bario           | mg/L     | 0.7                                                  | 0.024                     | 0.011     | 0.014     | 0.014     | 0.015     | 0.017     | 0.015     | 0.015     | 0.019     | 0.017     | 0.011     | 0.015     |
| berilio         | mg/L     | 0.0146                                               | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| bismuto         | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| boro            | mg/L     | 5                                                    | 0.01                      | < 0.05    | < 0.01    | < 0.05    | < 0.05    | < 0.05    | < 0.01    | < 0.05    | 0.1       | < 0.01    | < 0.01    | < 0.01    |
| cadmio          | mg/L     | 0.003                                                | < 0.00004                 | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.0002  | < 0.00004 | < 0.0002  | < 0.0002  | < 0.00004 | 0.00011   | < 0.00004 |
| calcio          | mg/L     |                                                      | 3.76                      | 4.45      | 2.59      | 3.23      | 3.88      | 5.03      | 4.24      | 4.11      | 3.46      | 5.13      | 1.97      | 3.5       |
| cromo           | mg/L     | 0.05                                                 | 0.0006                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobalto         | mg/L     |                                                      | 0.0015                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| cobre           | mg/L     | 1                                                    | 0.006                     | 0.002     | 0.0026    | < 0.001   | < 0.001   | < 0.001   | 0.0014    | 0.001     | 0.004     | 0.0009    | 0.0021    | 0.0013    |



Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Ubicación de Monitoreo W7 |           |           |           |           |           |           |           |           |           |           |           |
|-----------|----------|------------------------------------------------------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
|           |          |                                                      | Sept-07                   | Oct-07    | Nov-07    | Dic-07    | Ene-08    | Mar-08    | May-08    | Jun-08    | Sept-08   | Oct-08    | Nov-08    | Feb-09    |
| hierro    | mg/L     | 0.3                                                  | 1.27                      | 0.6       | 0.51      | 0.25      | 0.15      | 0.19      | 0.24      | 0.26      | 0.78      | 0.19      | 0.285     | 0.27      |
| plomo     | mg/L     | 0.01                                                 | 0.0004                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | 0.002     | < 0.0002  | < 0.0002  | < 0.0002  |
| litio     | mg/L     | 0.0146                                               | 0.0005                    | < 0.001   | 0.0003    | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| magnesio  | mg/L     |                                                      | 1.78                      | 2.09      | 1.1       | 1.15      | 1.57      | 2.7       | 1.62      | 1.49      | 1.33      | 1.91      | 0.83      | 1.39      |
| manganeso | mg/L     | 0.1                                                  | 0.075                     | 0.12      | 0.019     | 0.014     | 0.008     | 0.011     | 0.014     | 0.018     | 0.028     | 0.013     | 0.014     | 0.018     |
| mercurio  | mg/L     | 0.001                                                | < 0.00002                 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| molibdeno | mg/L     | 0.07                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | 0.0002    | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| níquel    | mg/L     | 0.02                                                 | 0.0005                    | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0007    | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| fósforo   | mg/L     | 0.000146                                             | 0.05                      | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.15    | < 0.03    | < 0.15    | < 0.15    | < 0.03    | < 0.03    | < 0.03    |
| potasio   | mg/L     |                                                      | 0.72                      | 0.8       | 0.57      | 0.7       | 0.6       | 0.8       | 0.76      | 0.7       | 0.8       | 0.7       | 0.54      | 0.65      |
| selenio   | mg/L     | 0.01                                                 | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | 0.002     | < 0.0002  | < 0.001   | 0.001     | < 0.0002  | < 0.0002  | < 0.0002  |
| sílice    | mg/L     |                                                      | 7.68                      | 7.3       | 5.18      | 5.3       | 6.7       | 9.6       | 6.93      | 6.2       | 5.3       | 8.29      | 5.3       | 6.24      |
| plata     | mg/L     | 0.05                                                 | < 0.00005                 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00025 | < 0.00025 | < 0.00005 | < 0.00005 | < 0.00005 |
| sodio     | mg/L     | ≤ 200                                                | 3.72                      | 3.84      | 2.48      | 2.98      | 3.47      | 6.31      | 3.76      | 3.49      | 3.13      | 3.8       | 2.16      | 3.31      |
| estroncio | mg/L     | 4.4                                                  | 0.028                     | 0.027     | 0.021     | 0.024     | 0.031     | 0.049     | 0.033     | 0.03      | 0.028     | 0.042     | 0.016     | 0.03      |
| telurio   | mg/L     |                                                      | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| talio     | mg/L     |                                                      | < 0.00002                 | < 0.0001  | < 0.00002 | < 0.0001  | 0.0002    | < 0.0001  | < 0.00002 | < 0.00001 | < 0.0001  | < 0.00002 | < 0.00002 | < 0.00002 |
| torio     | mg/L     |                                                      | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| estaño    | mg/L     | 4.4                                                  | < 0.0002                  | < 0.001   | < 0.0002  | < 0.001   | < 0.001   | < 0.001   | 0.0008    | < 0.001   | < 0.001   | < 0.0002  | < 0.0002  | < 0.0002  |
| titanio   | mg/L     |                                                      | 0.016                     | 0.003     | 0.016     | 0.002     | 0.002     | 0.003     | 0.003     | 0.001     | 0.006     | 0.0014    | 0.00685   | 0.0024    |
| uranio    | mg/L     | 0.02                                                 | < 0.0001                  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0005  | < 0.0005  | < 0.0001  | < 0.0001  | < 0.0001  |
| vanadio   | mg/L     |                                                      | 0.0044                    | 0.001     | 0.0017    | < 0.001   | < 0.001   | < 0.001   | 0.0009    | < 0.001   | 0.002     | 0.0008    | 0.00115   | 0.0009    |
| zinc      | mg/L     | 5                                                    | 0.003                     | < 0.005   | 0.001     | < 0.005   | < 0.005   | < 0.005   | 0.002     | < 0.005   | 0.009     | 0.001     | 0.0015    | < 0.001   |
| zirconio  | mg/L     |                                                      | < 0.002                   | < 0.01    | < 0.002   | < 0.01    | < 0.01    | < 0.01    | < 0.002   | < 0.19    | < 0.01    | < 0.002   | < 0.002   | < 0.002   |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                                                     | Unidades                                | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |        |        |          |                |        |
|---------------------------------------------------------------|-----------------------------------------|------------------------------------------------------|----------------------------|--------|--------|----------|----------------|--------|
|                                                               |                                         |                                                      | Mínimo                     | Máximo | Media  | Promedio | Desv. Estándar | Conteo |
| Parámetros de Campo                                           |                                         |                                                      |                            |        |        |          |                |        |
| temperatura                                                   | °C                                      | ≤15                                                  | 22.5                       | 35.4   | 25.45  | 25.7654  | 1.83889        | 78     |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 5.3                        | 8.27   | 7.23   | 6.8      | -              | 65     |
| conductividad                                                 | µS/cm                                   |                                                      | 30                         | 280    | 60     | 76.8356  | 52.4714        | 73     |
| redox                                                         | mV                                      |                                                      | 20                         | 319    | 180    | 173.509  | 72.6467        | 57     |
| turbidez                                                      | NTU                                     | 1                                                    | 0.5                        | 648    | 4.54   | 31.1176  | 102.362        | 54     |
| General Parámetros                                            |                                         |                                                      |                            |        |        |          |                |        |
| pH                                                            | unidades de pH                          | 6.5 - 8.5                                            | 6.45                       | 7.71   | 7.32   | 7.1052   | -              | 81     |
| conductividad                                                 | µS/cm                                   |                                                      | 25.5                       | 85     | 54     | 55.0185  | 12.3469        | 81     |
| dureza                                                        | mg/L como CaCO <sub>3</sub>             | 100                                                  | 6.55                       | 30     | 16.6   | 17.4846  | 4.89624        | 81     |
| dureza total                                                  | mg/L como CaCO <sub>3</sub>             | 100                                                  | 6.4                        | 30.1   | 17     | 17.634   | 5.2572         | 81     |
| sólidos disueltos totales                                     | µS/cm                                   | 500                                                  | 15.5                       | 96     | 49     | 47.784   | 14.5684        | 81     |
| total sólidos en suspensión                                   | mg/L                                    |                                                      | <1                         | 1610   | 3      | 48.4321  | 239.865        | 81     |
| alcalinidad total                                             | mg/L como CaCO <sub>3</sub>             | 120                                                  | 7                          | 41.3   | 19.4   | 19.9086  | 6.04167        | 81     |
| alcalinidad de bicarbonatos                                   | mg/L como HCO <sub>3</sub> <sup>-</sup> |                                                      | 8.6                        | 50.4   | 23.6   | 24.2809  | 7.37176        | 81     |
| alcalinidad de carbonatos                                     | CO <sub>3</sub> <sup>2-</sup>           |                                                      | <0.5                       | <0.5   | -      | -        | -              | 81     |
| alcalinidad de hidróxidos                                     | mg/L como OH <sup>-</sup>               |                                                      | <0.5                       | <0.5   | -      | -        | -              | 81     |
| Nutrientes                                                    |                                         |                                                      |                            |        |        |          |                |        |
| nitrógeno de amoníaco                                         | mg/L como N                             |                                                      | <0.01                      | 0.17   | <0.01  | 0.0113   | 0.0212         | 81     |
| nitrato y NITRITO (NO <sub>3</sub> + NO <sub>2</sub> ) como N | mg/L                                    |                                                      | <0.04                      | 0.24   | 0.075  | 0.08753  | 0.05167        | 81     |
| nitrato (NO <sub>3</sub> ) como N                             | mg/L                                    | 10                                                   | <0.04                      | 0.24   | 0.07   | 0.08531  | 0.05362        | 65     |
| nitrite (NO <sub>2</sub> ) como N                             | mg/L                                    | 1                                                    | <0.002                     | 0.003  | <0.002 | <0.002   | 0.00039        | 81     |
| nitrógeno kjeldahl total                                      | mg/L como N                             |                                                      | <0.2                       | 0.8    | <0.2   | <0.2     | 0.13502        | 81     |
| Aniones                                                       |                                         |                                                      |                            |        |        |          |                |        |
| cloruro                                                       | mg/L                                    | 250                                                  | 2.02                       | 4.73   | 3.55   | 3.45068  | 0.57693        | 81     |
| fluoruro                                                      | mg/L                                    | 1                                                    | <0.05                      | 0.18   | <0.05  | <0.05    | 0.01761        | 81     |
| sulfato                                                       | mg/L                                    | 250                                                  | 1.14                       | 7.34   | 3.5    | 3.54352  | 1.53538        | 81     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro                            | Unidades    | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |         |          |          |                |        |
|--------------------------------------|-------------|------------------------------------------------------|----------------------------|---------|----------|----------|----------------|--------|
|                                      |             |                                                      | Mínimo                     | Máximo  | Media    | Promedio | Desv. Estándar | Conteo |
| Orgánicos                            |             |                                                      |                            |         |          |          |                |        |
| nitrógeno orgánico total             | mg/L        |                                                      | <0.2                       | 0.8     | <0.2     | <0.2     | 0.13443        | 81     |
| demanda química de oxígeno           | mg/L        |                                                      | <10                        | 148     | 10       | 20.8827  | 25.1945        | 81     |
| carbono orgánico disuelto            | mg/L como C |                                                      | <1                         | 4.4     | 1.5      | 1.64568  | 0.91734        | 81     |
| aceite y grasa totales               | mg/L        |                                                      | <2                         | 12      | <2       | 2.30864  | 2.20166        | 81     |
| aceite y grasa en hidrocarburos      | mg/L        |                                                      | <2                         | <2      | -        | -        | -              | 81     |
| fenoles totales                      | mg/L        | 0.001                                                | <0.001                     | 0.047   | <0.001   | 0.0031   | 0.00816        | 79     |
| coliformes totales                   | CFU/100mL   |                                                      | 1,100                      | 28,000  | 5,900    | 7,379.03 | 5,500.18       | 31     |
| coliformes fecales                   | CFU/100mL   |                                                      | 200                        | 10,000  | 1,600    | 2,500    | 2,380.58       | 31     |
| Especies de Cianuro                  |             |                                                      |                            |         |          |          |                |        |
| cianuro total                        | mg/L        | 0.001                                                | <0.002                     | <0.01   | -        | -        | -              | 81     |
| cianuro disociable en ácidos débiles | mg/L        |                                                      | <0.002                     | <0.01   | -        | -        | -              | 81     |
| Metales Disueltos                    |             |                                                      |                            |         |          |          |                |        |
| aluminio                             | mg/L        |                                                      | 0.002                      | 2.17    | 0.045    | 0.08473  | 0.2394         | 81     |
| antimonio                            | mg/L        |                                                      | <0.0002                    | 0.0007  | 0.0002   | 0.00029  | 0.0002         | 81     |
| arsénico                             | mg/L        |                                                      | <0.0002                    | 0.0005  | <0.0002  | 0.00028  | 0.0002         | 81     |
| bario                                | mg/L        |                                                      | 0.0052                     | 0.075   | 0.014    | 0.01399  | 0.0075         | 81     |
| berilio                              | mg/L        |                                                      | <0.0002                    | <0.001  | -        | -        | -              | 81     |
| bismuto                              | mg/L        |                                                      | <0.0002                    | <0.001  | -        | -        | -              | 81     |
| boro                                 | mg/L        |                                                      | <0.01                      | 0.06    | <0.01    | 0.01494  | 0.01213        | 81     |
| cadmio                               | mg/L        |                                                      | <0.00004                   | 0.00018 | <0.00004 | 5.9E-05  | 4.3E-05        | 81     |
| calcio                               | mg/L        |                                                      | 1.46                       | 6.83    | 4.06     | 4.11858  | 1.11966        | 81     |
| cromo                                | mg/L        |                                                      | <0.0002                    | 0.0007  | 0.0003   | 0.00031  | 0.00019        | 81     |
| cobalto                              | mg/L        |                                                      | <0.0002                    | 0.0067  | 0.001    | 0.00177  | 0.00169        | 81     |
| cobre                                | mg/L        |                                                      | <0.0003                    | 0.0145  | 0.001    | 0.00286  | 0.00348        | 81     |
| hierro                               | mg/L        |                                                      | <0.01                      | 1.13    | 0.14     | 0.14154  | 0.1237         | 81     |
| plomo                                | mg/L        |                                                      | <0.0002                    | 0.0036  | <0.0002  | 0.00034  | 0.00045        | 81     |
| litio                                | mg/L        |                                                      | <0.0002                    | 0.001   | 0.0002   | 0.00031  | 0.00023        | 81     |
| magnesio                             | mg/L        |                                                      | 0.695                      | 3.455   | 1.64     | 1.73204  | 0.55035        | 81     |
| manganeso                            | mg/L        |                                                      | 0.0044                     | 0.364   | 0.022    | 0.04138  | 0.05347        | 81     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro              | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |          |          |                |        |
|------------------------|----------|------------------------------------------------------|----------------------------|----------|----------|----------|----------------|--------|
|                        |          |                                                      | Mínimo                     | Máximo   | Media    | Promedio | Desv. Estándar | Conteo |
| mercurio               | mg/L     |                                                      | <0.00002                   | <0.00002 | -        | -        | -              | 81     |
| molibdeno              | ug/L     |                                                      | <0.0001                    | 0.001    | 0.00025  | 0.00027  | 0.00025        | 81     |
| níquel                 | mg/L     |                                                      | <0.0002                    | 0.002    | 0.0005   | 0.00041  | 0.00026        | 81     |
| fósforo                | mg/L     |                                                      | <0.03                      | <0.15    | -        | -        | -              | 81     |
| potasio                | mg/L     |                                                      | 0.5                        | 0.87     | 0.67     | 0.66883  | 0.08311        | 81     |
| selenio                | mg/L     |                                                      | <0.0002                    | 0.003    | <0.0002  | 0.00036  | 0.00049        | 81     |
| sílice                 | mg/L     |                                                      | 4.065                      | 12.7     | 7.1      | 7.39988  | 1.67723        | 81     |
| plata                  | mg/L     |                                                      | <0.00005                   | 0.000125 | <0.00005 | 6.7E-05  | 4.9E-05        | 81     |
| sodio                  | mg/L     |                                                      | 1.995                      | 6.97     | 3.54     | 3.68099  | 0.89613        | 81     |
| estroncio              | mg/L     |                                                      | 0.0125                     | 0.058    | 0.031    | 0.03144  | 0.00922        | 81     |
| telurio                | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 81     |
| talio                  | mg/L     |                                                      | <0.00002                   | 0.00006  | <0.00002 | 2.7E-05  | 2E-05          | 81     |
| torio                  | mg/L     |                                                      | <0.0001                    | <0.0005  | -        | -        | -              | 81     |
| estaño                 | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 81     |
| titanio                | mg/L     |                                                      | <0.0003                    | 0.0073   | 0.001    | 0.0018   | 0.00167        | 81     |
| uranio                 | mg/L     |                                                      | <0.0001                    | <0.0005  | -        | -        | -              | 81     |
| vanadio                | mg/L     |                                                      | <0.0004                    | 0.0044   | 0.0007   | 0.00079  | 0.0005         | 81     |
| zinc                   | mg/L     |                                                      | <0.001                     | 0.012    | 0.0025   | 0.00241  | 0.00177        | 81     |
| zirconio               | mg/L     |                                                      | <0.002                     | <0.01    | -        | -        | -              | 81     |
| <b>Metales Totales</b> |          |                                                      |                            |          |          |          |                |        |
| aluminio               | mg/L     | 0.2                                                  | 0.009                      | 17.9     | 0.13     | 0.57144  | 2.0313         | 80     |
| antimonio              | mg/L     | 0.005                                                | <0.0002                    | <0.001   | -        | -        | -              | 81     |
| arsénico               | mg/L     | 0.01                                                 | <0.0002                    | 0.0005   | <0.0002  | 0.0003   | 0.0002         | 81     |
| bario                  | mg/L     | 0.7                                                  | 0.0038                     | 0.152    | 0.015    | 0.01703  | 0.01579        | 81     |
| berilio                | mg/L     | 0.0146                                               | <0.0002                    | 0.0005   | <0.0002  | 0.0003   | 0.0002         | 81     |
| bismuto                | mg/L     |                                                      | <0.0002                    | <0.001   | -        | -        | -              | 81     |
| boro                   | mg/L     | 5                                                    | <0.01                      | 0.1      | 0.01     | 0.0171   | 0.01721        | 81     |
| cadmio                 | mg/L     | 0.003                                                | <0.00004                   | 0.0002   | 0.0001   | 6.5E-05  | 4.5E-05        | 81     |
| calcio                 | mg/L     |                                                      | 1.5                        | 6.74     | 3.95     | 4.03463  | 1.13332        | 81     |
| cromo                  | mg/L     | 0.05                                                 | <0.0002                    | 0.0029   | 0.0005   | 0.00038  | 0.00035        | 81     |
| cobalto                | mg/L     |                                                      | <0.0002                    | 0.018    | 0.0005   | 0.00064  | 0.00201        | 81     |

Tabla 18      Tabla de Análisis de Calidad de Agua Dulce para la Evaluación de Riesgos a la Salud Ecológica (Cuenca del Río San Juan) (continuación)

| Parámetro | Unidades | Criterios Asociados a la Salud Humana <sup>(a)</sup> | Estadística <sup>(b)</sup> |          |         |          |                |        |
|-----------|----------|------------------------------------------------------|----------------------------|----------|---------|----------|----------------|--------|
|           |          |                                                      | Mínimo                     | Máximo   | Media   | Promedio | Desv. Estándar | Conteo |
| cobre     | mg/L     | 1                                                    | <0.0003                    | 0.04     | 0.0014  | 0.00454  | 0.00624        | 81     |
| hierro    | mg/L     | 0.3                                                  | <0.03                      | 12.7     | 0.25    | 0.50444  | 1.43694        | 81     |
| plomo     | mg/L     | 0.01                                                 | <0.0002                    | 0.004    | 0.0004  | 0.00041  | 0.00062        | 81     |
| litio     | mg/L     | 0.0146                                               | <0.0002                    | 0.0071   | 0.0005  | 0.00048  | 0.0008         | 81     |
| magnesio  | mg/L     |                                                      | 0.63                       | 3.8      | 1.67    | 1.83216  | 0.63972        | 81     |
| manganeso | mg/L     | 0.1                                                  | 0.0025                     | 1.09     | 0.019   | 0.04641  | 0.1247         | 81     |
| mercurio  | mg/L     | 0.001                                                | <0.00002                   | <0.00002 | -       | -        | -              | 81     |
| molibdeno | mg/L     | 0.07                                                 | <0.0001                    | 0.001    | 0.00025 | 0.00028  | 0.00024        | 81     |
| níquel    | mg/L     | 0.02                                                 | <0.0002                    | 0.0026   | 0.0005  | 0.00035  | 0.00032        | 81     |
| fósforo   | mg/L     | 0.000146                                             | <0.03                      | 0.15     | 0.05    | 0.04617  | 0.03189        | 81     |
| potasio   | mg/L     |                                                      | 0.52                       | 1.6      | 0.7     | 0.69432  | 0.14566        | 81     |
| selenio   | mg/L     | 0.01                                                 | <0.0002                    | 0.003    | <0.0002 | 0.00046  | 0.00058        | 81     |
| sílice    | mg/L     |                                                      | 4.445                      | 14.7     | 7.6     | 7.68179  | 1.93182        | 81     |
| plata     | mg/L     | 0.05                                                 | <0.00005                   | 0.0003   | 0.00006 | 7.6E-05  | 5.5E-05        | 81     |
| sodio     | mg/L     | ≤ 200                                                | 2.03                       | 7.29     | 3.7     | 3.74469  | 0.93699        | 81     |
| estroncio | mg/L     | 4.4                                                  | 0.0098                     | 0.052    | 0.03    | 0.03111  | 0.0092         | 81     |
| telurio   | mg/L     |                                                      | <0.0002                    | <0.001   | -       | -        | -              | 81     |
| talio     | mg/L     |                                                      | <0.00001                   | 0.0004   | 0.00001 | 3.2E-05  | 5E-05          | 81     |
| torio     | mg/L     |                                                      | <0.0001                    | 0.0008   | <0.0001 | 0.00016  | 0.00012        | 81     |
| estaño    | mg/L     | 4.4                                                  | <0.0002                    | 0.0008   | <0.0002 | 0.0003   | 0.00021        | 81     |
| titanio   | mg/L     |                                                      | <0.0004                    | 0.0375   | 0.002   | 0.00424  | 0.00611        | 81     |
| uranio    | mg/L     | 0.02                                                 | <0.0001                    | 0.00025  | <0.0001 | 0.00015  | 0.0001         | 81     |
| vanadio   | mg/L     |                                                      | <0.0004                    | 0.024    | 0.0009  | 0.00138  | 0.00276        | 81     |
| zinc      | mg/L     | 5                                                    | <0.001                     | 0.046    | 0.0025  | 0.00319  | 0.00564        | 81     |
| zirconio  | mg/L     |                                                      | <0.002                     | <0.19    | -       | -        | -              | 81     |

<sup>(a)</sup> Basado en los criterios definidos en Golder (2007): Proyecto Petaquilla - Revisión de la calidad del agua de parte de los reguladores.

<sup>(b)</sup> En los cálculos estadísticos, se utilizó un valor de la mitad del límite de detección.

**0.3** - denota una excedencia por encima de los criterios seleccionados asociados a la salud humana.

Tabla 19 Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2007)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | BRYCON H1, SP8-A | BRYCON H1, SP8-B | BRYCON H1, SP8-C | BRYCON H1, SP8-D | BRYCON SP HP1-A | BRYCON SP HP1-B | BRYCON SP HP1-C |
|--------------------------------|----------------------------------------------------------|-------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|
| Especies/Longitud              |                                                          |       |                  |                  |                  |                  |                 |                 |                 |
| Fecha de la Muestra            |                                                          |       | 19-Set-07        | 19-Set-07        | 19-Set-07        | 19-Set-07        | 16-Set-07       | 16-Set-07       | 16-Set-07       |
| Identificación del Laboratorio |                                                          |       | L584322-1        | L584322-2        | L584322-3        | L584322-4        | L584322-7       | L584322-8       | L584322-9       |
| Matriz                         |                                                          |       | Tejido           | Tejido           | Tejido           | Tejido           | Tejido          | Tejido          | Tejido          |
| <b>Parámetros Físicos</b>      |                                                          |       |                  |                  |                  |                  |                 |                 |                 |
| % de humedad                   |                                                          |       | 72.7             | 73.6             | 69.1             | 71               | 74.4            | 73.5            | 80.6            |
| <b>Metales</b>                 |                                                          |       |                  |                  |                  |                  |                 |                 |                 |
| aluminio                       | <u>270</u>                                               |       | 50.8             | <4.0             | 22               | 13.3             | 15.1            | <4.0            | 6.5             |
| antimonio                      | <u>0.108</u>                                             | m     | <0.010           | <0.020           | <0.020           | <0.020           | <0.020          | <0.020          | <0.020          |
| arsénico                       | <u>0.021</u>                                             |       | <0.010           | <0.020           | <0.020           | <0.020           | <0.020          | <0.020          | <u>0.028</u>    |
| bario                          | <u>54</u>                                                |       | 4.55             | 3.26             | 3.5              | 2.9              | 3.33            | 7.82            | 3.52            |
| berilio                        | <u>0.54</u>                                              |       | <0.10            | <0.20            | <0.20            | <0.20            | <0.20           | <0.20           | <0.20           |
| bismuto                        | -                                                        |       | <0.030           | <0.060           | <0.060           | <0.060           | <0.060          | <0.060          | <0.060          |
| boro                           | <u>54</u>                                                |       | 4.9              | 5.2              | <4.0             | 7.1              | 8               | <4.0            | 9.9             |
| cadmio                         | <u>0.27</u>                                              | d     | 0.0515           | 0.063            | 0.069            | 0.061            | 0.11            | 0.101           | 0.135           |
| calcio                         | -                                                        |       | 11800            | 12100            | 11600            | 12900            | 13000           | 15100           | 14000           |
| cromo                          | <u>0.812</u>                                             | p     | 0.3              | 0.22             | 0.22             | 0.38             | <0.20           | 0.73            | <0.20           |
| cobalto                        | <u>0.0812</u>                                            |       | <0.020           | <0.040           | <0.040           | <0.040           | <0.040          | <0.040          | <0.040          |
| cobre                          | <u>10.82</u>                                             |       | 0.507            | 0.652            | 0.577            | 0.543            | 0.8             | 0.83            | 0.877           |
| plomo                          | -                                                        |       | 0.417            | 0.233            | 0.447            | 0.619            | 1.14            | 2.06            | 2.16            |
| litio                          | <u>0.54</u>                                              | l     | <0.10            | <0.20            | <0.20            | <0.20            | <0.20           | <0.20           | <0.20           |
| magnesio                       | -                                                        |       | 422              | 420              | 438              | 459              | 473             | 566             | 485             |
| manganeso                      | <u>37.8</u>                                              | d     | 11.8             | 15.5             | 13.4             | 13.3             | 16.3            | 22.7            | 21.2            |
| mercurio                       | <u>0.027</u>                                             | h     | 0.018            | <u>0.029</u>     | 0.0109           | 0.0186           | 0.0129          | <u>0.0326</u>   | 0.0209          |
| molibdeno                      | <u>1.352</u>                                             |       | 0.051            | 0.03             | 0.04             | 0.063            | <0.020          | <0.020          | <0.020          |
| níquel                         | <u>5.4</u>                                               | s     | 0.14             | <0.20            | <0.20            | 0.24             | <0.20           | <0.20           | <0.20           |
| selenio                        | <u>1.352</u>                                             |       | 0.189            | 0.265            | 0.123            | 0.145            | 0.425           | 0.341           | 0.558           |
| plata                          | <u>1.35</u>                                              |       | <0.010           | <0.020           | <0.020           | <0.020           | <0.020          | <0.020          | <0.020          |
| estroncio                      | <u>162.2</u>                                             |       | 56.9             | 40.5             | 40.4             | 33.3             | 42              | 67.9            | 47              |
| talio                          | <u>0.0175</u>                                            | s     | <0.010           | <0.020           | <0.020           | <0.020           | <0.020          | <0.020          | <0.020          |
| estaño                         | <u>162.2</u>                                             |       | <0.050           | <0.10            | <0.10            | <0.10            | <0.10           | <0.10           | <0.10           |
| uranio                         | <u>0.812</u>                                             | s     | <0.0020          | <0.0040          | <0.0040          | <0.0040          | <0.0040         | <0.0040         | <0.0040         |
| vanadio                        | <u>1.362</u>                                             |       | <0.10            | <0.20            | <0.20            | <0.20            | 0.23            | <0.20           | <0.20           |
| zinc                           | <u>81.2</u>                                              | m     | 26.3             | 31.6             | 22.4             | 28.3             | 37              | 37.4            | 41.7            |

**Tabla 19**
**Tabla de Análisis de Línea Base de Tejidos Musculares de Metales en Peces de Agua Dulce para la Evaluación de Riesgo a la Salud Humana y a la Ecología (2007)**
  
(continuación)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | BRYCON SP HP1-D | BRYCON SP HP1-E | SP1 GUABINA HSJ1 | BRYCON SP2 HSJ1 | SEPTIA BRYCON SP#1 H3/W3 | GUABINA HU2A | BRYCON SP#1 H5/W5 |
|--------------------------------|----------------------------------------------------------|-------|-----------------|-----------------|------------------|-----------------|--------------------------|--------------|-------------------|
| Especies/Longitud              |                                                          |       |                 |                 |                  |                 |                          |              |                   |
| Fecha de la Muestra            |                                                          |       | 16-Set-07       | 16-Set-07       | 26-Set-07        | 26-Set-07       | 19-Set-07                | 21-Set-07    | 17-Set-07         |
| Identificación del Laboratorio |                                                          |       | L584322-10      | L584322-11      | L584322-12       | L584322-13      | L584322-14               | L584322-15   | L584322-16        |
| Matriz                         |                                                          |       | Tejido          | Tejido          | Tejido           | Tejido          | Tejido                   | Tejido       | Tejido            |
| <b>Parámetros Físicos</b>      |                                                          |       |                 |                 |                  |                 |                          |              |                   |
| % de humedad                   |                                                          |       | 73.4            | 74.8            | 77.8             | 76.3            | 73                       | 73.4         | 72.8              |
| <b>Metales</b>                 |                                                          |       |                 |                 |                  |                 |                          |              |                   |
| aluminio                       | <u>270</u>                                               |       | 4.2             | 4.2             | 5.8              | 8.5             | 5.7                      | 6.7          | 4.4               |
| antimonio                      | <u>0.108</u>                                             | m     | <0.010          | <0.020          | <0.010           | <0.020          | <0.020                   | <0.020       | <0.010            |
| arsénico                       | <u>0.021</u>                                             |       | <u>0.024</u>    | <0.020          | <u>0.097</u>     | <0.020          | <0.020                   | <0.020       | <0.010            |
| bario                          | <u>54</u>                                                |       | 4               | 4.35            | 4.14             | 3.89            | 3.62                     | 2.67         | 1.18              |
| berilio                        | <u>0.54</u>                                              |       | <0.10           | <0.20           | <0.10            | <0.20           | <0.20                    | <0.20        | <0.10             |
| bismuto                        | -                                                        |       | <0.030          | <0.060          | <0.030           | <0.060          | <0.060                   | <0.060       | <0.030            |
| boro                           | <u>54</u>                                                |       | 8.6             | 8.4             | 9.5              | 5.1             | 11.3                     | 5.5          | 5                 |
| cadmio                         | <u>0.27</u>                                              | d     | 0.0954          | 0.16            | 0.0423           | 0.039           | 0.199                    | 0.026        | 0.0283            |
| calcio                         | -                                                        |       | 13,000          | 15,400          | 12,400           | 19,700          | 13,400                   | 13,000       | 6170              |
| cromo                          | <u>0.812</u>                                             | p     | 0.33            | <0.20           | 0.41             | 0.29            | 0.56                     | 0.2          | <0.10             |
| cobalto                        | <u>0.0812</u>                                            |       | <0.020          | <0.040          | 0.04             | 0.064           | <0.040                   | <u>0.146</u> | <0.020            |
| cobre                          | <u>10.82</u>                                             |       | 0.955           | 0.934           | 0.742            | 0.462           | 0.636                    | 0.494        | 0.921             |
| plomo                          | -                                                        |       | 2.26            | 1.45            | 0.025            | 0.41            | 0.12                     | 0.051        | 0.038             |
| litio                          | <u>0.54</u>                                              | l     | <0.10           | <0.20           | <0.10            | <0.20           | <0.20                    | <0.20        | <0.10             |
| magnesio                       | -                                                        |       | 431             | 502             | 447              | 540             | 492                      | 437          | 328               |
| manganeso                      | <u>37.8</u>                                              | d     | 23.8            | 31.7            | 4.6              | 21.8            | 11.2                     | 24.1         | 2.87              |
| mercurio                       | <u>0.027</u>                                             | h     | 0.0236          | 0.0191          | <u>0.0311</u>    | 0.0125          | 0.0117                   | 0.0115       | 0.0024            |
| molibdeno                      | <u>1.352</u>                                             |       | 0.016           | 0.03            | 0.072            | <0.020          | 0.069                    | <0.020       | 0.012             |
| níquel                         | <u>5.4</u>                                               | s     | <0.10           | <0.20           | 0.22             | <0.20           | 0.37                     | <0.20        | <0.10             |
| selenio                        | <u>1.352</u>                                             |       | 0.503           | 0.437           | 0.698            | 0.185           | 0.147                    | 0.208        | 0.133             |
| plata                          | <u>1.35</u>                                              |       | <0.010          | <0.020          | <0.010           | <0.020          | <0.020                   | <0.020       | <0.010            |
| estroncio                      | <u>162.2</u>                                             |       | 48.5            | 49.9            | 40.9             | 43.1            | 48.4                     | 29.1         | 12.7              |
| talio                          | <u>0.0175</u>                                            | s     | <0.010          | <0.020          | <0.010           | <0.020          | <0.020                   | <0.020       | <0.010            |
| estaño                         | <u>162.2</u>                                             |       | <0.050          | <0.10           | 0.056            | <0.10           | <0.10                    | <0.10        | <0.050            |
| uranio                         | <u>0.812</u>                                             | s     | <0.0020         | <0.0040         | <0.0020          | <0.0040         | <0.0040                  | <0.0040      | <0.0020           |
| vanadio                        | <u>1.362</u>                                             |       | 0.18            | 0.29            | <0.10            | 0.43            | <0.20                    | 0.39         | <0.10             |
| zinc                           | <u>81.2</u>                                              | m     | 34.9            | 42.8            | 20               | 28.4            | 24.9                     | 28.8         | 19.2              |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008); Normas específicas del sitio: m = metálico; d = dieta; p = partículas de cromo VI; i = sales inorgánicas; s = sales solubles; h = metilmercurio

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima, ‘-’ = no disponible.

|            |                                                                                   |
|------------|-----------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo |

**Tabla 20**      **Tablas de Análisis de Línea Base de Hidrocarburos Aromáticos Policíclicos Tejidos Musculares de Peces de Agua Dulce para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2007)**

| Identificación de la Muestra          | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | SP1 GUABINA<br>HSJ1 | BRYCON SP2<br>HSJ1 | BRYCON SP#1<br>H5/W5 |
|---------------------------------------|-------------------------------------------------------------|---------------------|--------------------|----------------------|
| Especies/Longitud                     |                                                             |                     |                    |                      |
| Fecha de la Muestra                   |                                                             | 26-Set-07           | 26-Set-07          | 17-Set-07            |
| Identificación del Laboratorio        |                                                             | L584322-12          | L584322-13         | L584322-16           |
| Matriz                                |                                                             | Tejido              | Tejido             | Tejido               |
| Hidrocarburos Aromáticos Policíclicos |                                                             |                     |                    |                      |
| acenafteno                            | <u>16.22</u>                                                | <0.010              | <0.010             | <0.010               |
| acenaftileno                          |                                                             | <0.010              | <0.010             | <0.010               |
| antraceno                             | <u>81.2</u>                                                 | <0.010              | <0.010             | <0.010               |
| benzo(a)antraceno                     | <u>0.0432</u>                                               | <0.010              | <0.010             | <0.010               |
| benzo(a)pireno                        | <u>0.00432</u>                                              | <0.010              | <0.010             | <0.010               |
| benzo(b)fluoranteno                   | <u>0.0432</u>                                               | <0.010              | <0.010             | <0.010               |
| benzo(g,h,i)perileno                  |                                                             | <0.010              | <0.010             | <0.010               |
| benzo(k)fluoranteno                   | <u>0.432</u>                                                | <0.010              | <0.010             | <0.010               |
| criseno                               | <u>4.32</u>                                                 | <0.010              | <0.010             | <0.010               |
| dibenzo(a,h)antraceno                 | <u>0.00432</u>                                              | <0.010              | <0.010             | <0.010               |
| fluoranteno                           | <u>10.82</u>                                                | <0.010              | <0.010             | <0.010               |
| fluoreno                              | <u>10.82</u>                                                | <0.010              | <0.010             | <0.010               |
| indeno(1,2,3-c,d)pireno               | <u>0.0432</u>                                               | <0.010              | <0.010             | <0.010               |
| naftaleno                             | <u>5.4</u>                                                  | <0.010              | <0.010             | <0.010               |
| fenantreno                            |                                                             | <0.010              | <0.010             | <0.010               |
| pireno                                | <u>8.12</u>                                                 | <0.010              | <0.010             | <0.010               |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008)

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |
|------------|
| <u>500</u> |
| 500        |

Igual o mayor al nivel de análisis en base al riesgo

El límite de detección del método es mayor al nivel de análisis en base al riesgo



**Tabla 21**      **Tablas de Análisis de Línea Base de Bifenilos Policlorados en Tejidos Musculares de Peces de Agua Dulce para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2007)**

| Identificación de la Muestra         | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | SP1 GUABINA<br>HSJ1 | BRYCON SP2<br>HSJ1 | BRYCON SP#1<br>H5/W5 |
|--------------------------------------|-------------------------------------------------------------|---------------------|--------------------|----------------------|
| Especies/<br>Longitud                |                                                             |                     |                    |                      |
| Fecha de la Muestra                  |                                                             | 26-Set-07           | 26-Set-07          | 17-Set-07            |
| Identificación del Laboratorio       |                                                             | L584322-12          | L584322-13         | L584322-16           |
| Matriz                               |                                                             | Tejido              | Tejido             | Tejido               |
| <b><i>Bifenilos Policlorados</i></b> |                                                             |                     |                    |                      |
| PCB-1016                             | <b><u>0.451</u></b>                                         | <0.050              | <0.050             | <0.050               |
| PCB-1221                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1232                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1242                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1248                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1254                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1260                             | <b><u>0.0158</u></b>                                        | <0.050              | <0.050             | <0.050               |
| PCB-1262                             |                                                             | <0.050              | <0.050             | <0.050               |
| PCB-1268                             |                                                             | <0.050              | <0.050             | <0.050               |
| Total PCB                            | <b><u>0.0158</u></b>                                        | <0.25               | <0.050             | <0.050               |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008)

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| <b><u>500</u></b> | Igual o mayor al nivel de análisis en base al riesgo.                              |
| 500               | El límite de detección del método es mayor al nivel de análisis en base al riesgo. |

**Tabla 22**      **Tablas de Análisis de Línea Base de Pesticidas Organoclorados en Tejidos Musculares de Peces de Agua Dulce para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2007)**

| Identificación de la Muestra            | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | SP1 GUABINA<br>HSJ1 | BRYCON<br>SP2 HSJ1 | BRYCON<br>SP#1 H5/W5 |
|-----------------------------------------|-------------------------------------------------------------|---------------------|--------------------|----------------------|
| Especies/Longitud                       |                                                             |                     |                    |                      |
| Fecha de la Muestra                     |                                                             | 26-Set-07           | 26-Set-07          | 17-Set-07            |
| Identificación del Laboratorio          |                                                             | L584322-12          | L584322-13         | L584322-16           |
| Matriz                                  |                                                             | Tejido              | Tejido             | Tejido               |
| <b><i>Pesticidas Organoclorados</i></b> |                                                             |                     |                    |                      |
| aldrín                                  | <u>0.00186</u>                                              | <0.010              | <0.010             | <0.010               |
| alfa-BHC                                | <u>0.00501</u>                                              | <0.010              | <0.010             | <0.010               |
| beta-BHC                                | <u>0.0175</u>                                               | <0.010              | <0.010             | <0.010               |
| lindano (gama-BHC)                      | <u>0.0287</u>                                               | <0.010              | <0.010             | <0.010               |
| delta-BHC                               |                                                             | <0.010              | <0.010             | <0.010               |
| cisclordano (alfa)                      |                                                             | <0.010              | <0.010             | <0.010               |
| transclordano (gama)                    |                                                             | <0.010              | <0.010             | <0.010               |
| 2,4'-DDD                                | <u>0.131</u>                                                | <0.010              | <0.010             | <0.010               |
| 4,4'-DDD                                |                                                             | <0.010              | <0.010             | <0.010               |
| 2,4'-DDE                                | <u>0.0928</u>                                               | <0.010              | <0.010             | <0.010               |
| 4,4'-DDE                                |                                                             | <0.010              | <0.010             | <0.010               |
| 2,4'-DDT                                | <u>0.0928</u>                                               | <0.010              | <0.010             | <0.010               |
| 4,4'-DDT                                |                                                             | <0.010              | <0.010             | <0.010               |
| dieldrín                                | <u>0.00197</u>                                              | <0.010              | <0.010             | <0.010               |
| endosulfán I                            |                                                             | <0.010              | <0.010             | <0.010               |
| endosulfán II                           |                                                             | <0.010              | <0.010             | <0.010               |
| endosulfán sulfato                      |                                                             | <0.010              | <0.010             | <0.010               |
| endrinaa                                | <u>0.0812</u>                                               | <0.010              | <0.010             | <0.010               |
| heptacloro                              | <u>0.00701</u>                                              | <0.010              | <0.010             | <0.010               |
| epóxido de heptacloro                   | <u>0.00347</u>                                              | <0.010              | <0.010             | <0.010               |
| metoxicloro                             | <u>1.352</u>                                                | <0.010              | <0.010             | <0.010               |
| mirex                                   | <u>0.00175</u>                                              | <0.010              | <0.010             | <0.010               |
| cisnonacloro                            |                                                             | <0.010              | <0.010             | <0.010               |
| transnonacloro                          |                                                             | <0.010              | <0.010             | <0.010               |
| oxiclordano                             |                                                             | <0.010              | <0.010             | <0.010               |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008)

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |                                                                                    |
|------------|------------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo.                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo. |

[illegible]

Tabla 23      Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)  
(continuación)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | TL PF1           | TL H4/W4         | TL H4/W4         | CF2 "GUABINA"    | TL CF1                | TL CF2 "GUABINA" | TL RF1 "RINCONCITO"   |
|--------------------------------|----------------------------------------------------------|-------|------------------|------------------|------------------|------------------|-----------------------|------------------|-----------------------|
| Especies/Longitud              |                                                          |       | GUABINA (25.1cm) | GUABINA (21.8cm) | GUABINA (20.4cm) | CAIMITO (13.5cm) | G. DORIMITOR (10.2cm) | CAIMITO (20.2cm) | G. DORIMITOR (15.7cm) |
| Fecha de la Muestra            |                                                          |       | 14-Mar-08        | 16-Mar-08        | 16-Mar-08        | 11-Mar-08        | 11-Mar-08             | 11-Mar-08        | 13-Mar-08             |
| Identificación del Laboratorio |                                                          |       | L677662-8        | L677662-9        | L677662-10       | L677662-11       | L677662-12            | L677662-13       | L677662-14            |
| Matriz                         |                                                          |       | Tejido           | Tejido           | Tejido           | Tejido           | Tejido                | Tejido           | Tejido                |
| <b>Parámetros físicos</b>      |                                                          |       |                  |                  |                  |                  |                       |                  |                       |
| % de humedad                   |                                                          |       | 73.9             | 74.6             | 73.8             | 77.2             | 74.1                  | 77.1             | 72.6                  |
| <b>Metales</b>                 |                                                          |       |                  |                  |                  |                  |                       |                  |                       |
| aluminio                       | <u>270</u>                                               | m     | 7.7              | 18.9             | 34.6             | 4.9              | 5.2                   | 5.4              | 8.3                   |
| antimonio                      | <u>0.108</u>                                             |       | <0.010           | <0.020           | <0.010           | <0.010           | <0.020                | <0.020           | <0.020                |
| arsénico                       | <u>0.021</u>                                             |       | <u>2.11</u>      | <u>0.112</u>     | <u>0.109</u>     | <u>1.2</u>       | <u>1.29</u>           | <u>2.29</u>      | <u>0.52</u>           |
| bario                          | <u>54</u>                                                | p     | 4.1              | 3.75             | 3.59             | 6.46             | 8.13                  | 12.1             | 6.42                  |
| berilio                        | <u>0.54</u>                                              |       | <0.10            | <0.20            | <0.10            | <0.10            | <0.20                 | <0.20            | <0.20                 |
| bismuto                        | -                                                        |       | <0.030           | <0.060           | <0.030           | <0.030           | <0.060                | <0.060           | <0.060                |
| cadmio                         | <u>0.27</u>                                              | d     | 0.213            | 0.02             | 0.0189           | 0.0218           | 0.023                 | 0.055            | 0.038                 |
| calcio                         | -                                                        | l     | 7,450            | 10,200           | 10,900           | 12,500           | 12,800                | 10,900           | 15,500                |
| cromo                          | <u>0.812</u>                                             |       | 0.58             | 0.78             | 0.59             | 0.34             | <0.20                 | <u>0.82</u>      | 0.57                  |
| cobalto                        | <u>0.0812</u>                                            |       | 0.031            | 0.048            | <u>0.109</u>     | <0.020           | <0.040                | 0.041            | <0.040                |
| cobre                          | <u>10.82</u>                                             | s     | 1.88             | 0.395            | 0.584            | 0.365            | 0.461                 | 1.65             | 0.409                 |
| plomo                          | -                                                        |       | <0.020           | <0.040           | <0.020           | <0.020           | <0.040                | <0.040           | <0.040                |
| litio                          | <u>0.54</u>                                              |       | <0.10            | <0.20            | <0.10            | <0.10            | <0.20                 | <0.20            | <0.20                 |
| magnesio                       | -                                                        | h     | 364              | 435              | 435              | 439              | 460                   | 472              | 522                   |
| manganeso                      | <u>37.8</u>                                              |       | 4.07             | 8.15             | <u>40.9</u>      | 3.72             | 5.53                  | 7.03             | 4.37                  |
| mercurio                       | <u>0.027</u>                                             |       | <u>0.0394</u>    | <u>0.0414</u>    | <u>0.0405</u>    | 0.0127           | 0.0109                | <u>0.0375</u>    | <u>0.0314</u>         |
| molibdeno                      | <u>1.352</u>                                             | s     | 0.062            | 0.099            | 0.075            | 0.084            | 0.031                 | 0.078            | 0.152                 |
| níquel                         | <u>5.4</u>                                               |       | 0.33             | 0.47             | 0.32             | 0.18             | <0.20                 | 0.47             | 0.35                  |
| selenio                        | <u>1.352</u>                                             |       | 0.633            | 0.455            | 0.595            | 0.554            | 0.557                 | 0.447            | 0.288                 |
| estroncio                      | <u>162.2</u>                                             | s     | 28.8             | 32.2             | 32.9             | 74.6             | 63.6                  | 54.2             | 54                    |
| talio                          | <u>0.0175</u>                                            |       | <0.010           | <0.020           | <0.010           | <0.010           | <0.020                | <0.020           | <0.020                |
| estaño                         | <u>162.2</u>                                             |       | <0.050           | <0.10            | <0.050           | <0.050           | <0.10                 | <0.10            | <0.10                 |
| uranio                         | <u>0.812</u>                                             | m     | <0.0020          | <0.0040          | <0.0020          | <0.0020          | <0.0040               | <0.0040          | <0.0040               |
| vanadio                        | <u>1.362</u>                                             |       | <0.10            | <0.20            | 0.14             | <0.10            | 0.26                  | <0.20            | <0.20                 |
| zinc                           | <u>81.2</u>                                              |       | 18.6             | 24               | 19.9             | 17.5             | 26.7                  | 23.1             | 32.4                  |

**Tabla 23**
**Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)**
**(continuación)**

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | TL PF1 "PETAQUILLA" | SJF1             | TL PF1 "PETAQUILLA" | TL PF1           | TL W7            | TL PF1 "PETAQUILLA" | PF1 "GUABINA"    |
|--------------------------------|----------------------------------------------------------|-------|---------------------|------------------|---------------------|------------------|------------------|---------------------|------------------|
| Especies/Longitud              |                                                          |       | GUABINA (20.6cm)    | GUABINA (22.8cm) | GUABINA (16.4cm)    | GUABINA (17.6cm) | GUABINA (19.1cm) | GUABINA (23.4cm)    | GUABINA (19.7cm) |
| Fecha de la Muestra            |                                                          |       | 14-Mar-08           | 16-Mar-08        | 14-Mar-08           | 14-Mar-08        | 17-Mar-08        | 14-Mar-08           | 14-Mar-08        |
| Identificación del Laboratorio |                                                          |       | L677662-15          | L677662-16       | L677662-17          | L677662-18       | L677662-19       | L677662-20          | L677662-21       |
| Matriz                         |                                                          |       | Tejido              | Tejido           | Tejido              | Tejido           | Tejido           | Tejido              | Tejido           |
| Parámetros físicos             |                                                          |       |                     |                  |                     |                  |                  |                     |                  |
| % de humedad                   |                                                          |       | 77.8                | 74.9             | 74.3                | 74.4             | 75.4             | 78.8                | 76.3             |
| Metales                        |                                                          |       |                     |                  |                     |                  |                  |                     |                  |
| aluminio                       | 270                                                      |       | 2.7                 | 6.2              | 2.2                 | 3.6              | 6.7              | 4.6                 | <4.0             |
| antimonio                      | 0.108                                                    | m     | <0.010              | <0.010           | <0.010              | <0.010           | <0.020           | <0.010              | <0.020           |
| arsénico                       | 0.021                                                    |       | 2.04                | 0.318            | 1.94                | 1.98             | 0.269            | 0.515               | 1.76             |
| bario                          | 54                                                       |       | 4.87                | 2.85             | 4.08                | 4.02             | 4.52             | 12.6                | 5.19             |
| berilio                        | 0.54                                                     |       | <0.10               | <0.10            | <0.10               | <0.10            | <0.20            | <0.10               | <0.20            |
| bismuto                        | -                                                        |       | <0.030              | <0.030           | <0.030              | <0.030           | <0.060           | <0.030              | <0.060           |
| cadmio                         | 0.27                                                     | d     | 0.116               | 0.0175           | 0.0796              | 0.0453           | 0.022            | 0.0765              | 0.24             |
| calcio                         | -                                                        |       | 8,390               | 10,800           | 10,300              | 9,310            | 13,000           | 9,900               | 13,500           |
| cromo                          | 0.812                                                    | p     | 0.43                | 1.06             | 1.08                | 1.44             | 0.54             | 1.34                | 0.33             |
| cobalto                        | 0.0812                                                   |       | <0.020              | 0.038            | <0.020              | 0.023            | <0.040           | 0.038               | 0.051            |
| cobre                          | 10.82                                                    |       | 1.62                | 0.539            | 0.689               | 0.903            | 0.438            | 2.28                | 0.749            |
| plomo                          | -                                                        |       | 0.025               | <0.020           | 0.029               | 0.056            | <0.040           | 0.031               | 0.047            |
| litio                          | 0.54                                                     | l     | <0.10               | <0.10            | <0.10               | <0.10            | <0.20            | <0.10               | <0.20            |
| magnesio                       | -                                                        |       | 397                 | 422              | 426                 | 422              | 467              | 421                 | 466              |
| manganeso                      | 37.8                                                     | d     | 3.48                | 6.77             | 4.18                | 4.33             | 6.17             | 4.99                | 5.14             |
| mercurio                       | 0.027                                                    | h     | 0.0731              | 0.0462           | 0.0111              | 0.009            | 0.0433           | 0.0421              | 0.0428           |
| molibdeno                      | 1.352                                                    |       | 0.04                | 0.095            | 0.093               | 0.08             | 0.066            | 0.138               | 0.049            |
| níquel                         | 5.4                                                      | s     | 0.24                | 0.59             | 0.62                | 0.77             | 0.31             | 0.84                | 0.2              |
| selenio                        | 1.352                                                    |       | 0.634               | 0.567            | 0.562               | 0.706            | 0.758            | 0.702               | 0.755            |
| estroncio                      | 162.2                                                    |       | 28                  | 31.1             | 41.4                | 38.9             | 36.3             | 40.6                | 48.8             |
| talio                          | 0.0175                                                   | s     | <0.010              | <0.010           | <0.010              | <0.010           | <0.020           | <0.010              | <0.020           |
| estaño                         | 162.2                                                    |       | <0.050              | 0.055            | <0.050              | <0.050           | <0.10            | <0.050              | <0.10            |
| uranio                         | 0.812                                                    | s     | <0.0020             | <0.0020          | <0.0020             | <0.0020          | <0.0040          | <0.0020             | <0.0040          |
| vanadio                        | 1.362                                                    |       | <0.10               | <0.10            | <0.10               | <0.10            | <0.20            | <0.10               | <0.20            |
| zinc                           | 81.2                                                     | m     | 16.8                | 20.2             | 18.3                | 22               | 23.3             | 19.1                | 35.4             |

Tabla 23      Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)  
(continuación)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | TL RF1 "RINCONCITO" | TL BFH1          | TL HF1"GUABINA"  | TL CF1 "CAIMITO" | HFI "HOJA" | TL SJF1             | FL CF1            |
|--------------------------------|----------------------------------------------------------|-------|---------------------|------------------|------------------|------------------|------------|---------------------|-------------------|
| Especies/Longitud              |                                                          |       | GUABINA (19.3cm)    | GUABINA (23.0cm) | GUABINA (16.1cm) | GUABINA (10.6cm) | GUABINA    | BOCA CHICA (14.6cm) | BOCA CHICA (18cm) |
| Fecha de la Muestra            |                                                          |       | 13-Mar-08           | 18-Mar-08        | 13-Mar-08        | 11-Mar-08        | 13-Mar-08  | 16-Mar-08           | 11-Mar-08         |
| Identificación del Laboratorio |                                                          |       | L677662-22          | L677662-23       | L677662-24       | L677662-25       | L677662-26 | L677662-27          | L677662-28        |
| Matriz                         |                                                          |       | Tejido              | Tejido           | Tejido           | Tejido           | Tejido     | Tejido              | Tejido            |
| Parámetros físicos             |                                                          |       |                     |                  |                  |                  |            |                     |                   |
| % de humedad                   |                                                          |       | 77.4                | 77.2             | 76.1             | 74.2             | 76.7       | 71.5                | 74.9              |
| Metales                        |                                                          |       |                     |                  |                  |                  |            |                     |                   |
| aluminio                       | 270                                                      |       | 4                   | 26.1             | 12               | 5.8              | 11.9       | 617                 | 390               |
| antimonio                      | 0.108                                                    | m     | <0.010              | <0.020           | <0.010           | <0.020           | <0.010     | <0.020              | <0.020            |
| arsénico                       | 0.021                                                    |       | 1.31                | 0.03             | 0.9              | 1.49             | 1.06       | 0.129               | 0.075             |
| bario                          | 54                                                       |       | 5.77                | 3.7              | 10.2             | 9.9              | 4.95       | 16.8                | 34.8              |
| berilio                        | 0.54                                                     |       | <0.10               | <0.20            | <0.10            | <0.20            | <0.10      | <0.20               | <0.20             |
| bismuto                        | -                                                        |       | <0.030              | <0.060           | <0.030           | <0.060           | <0.030     | <0.060              | <0.060            |
| cadmio                         | 0.27                                                     | d     | 0.0471              | 0.031            | 0.0273           | 0.023            | 0.0271     | 0.041               | 0.047             |
| calcio                         | -                                                        |       | 10,300              | 11,900           | 10,600           | 15,100           | 8,900      | 15,400              | 17,100            |
| cromo                          | 0.812                                                    | p     | 0.51                | 0.82             | 1.33             | <0.20            | 1.75       | 4.4                 | 4.69              |
| cobalto                        | 0.0812                                                   |       | <0.020              | <0.040           | 0.047            | <0.040           | 0.029      | 0.562               | 0.491             |
| cobre                          | 10.82                                                    |       | 0.388               | 0.579            | 0.998            | 0.397            | 0.551      | 1.59                | 1.74              |
| plomo                          | -                                                        |       | <0.020              | 0.058            | <0.020           | <0.040           | <0.020     | 0.079               | 0.22              |
| litio                          | 0.54                                                     | l     | <0.10               | <0.20            | <0.10            | <0.20            | <0.10      | <0.20               | <0.20             |
| magnesio                       | -                                                        |       | 432                 | 452              | 433              | 525              | 413        | 497                 | 460               |
| manganeso                      | 37.8                                                     | d     | 2.32                | 12.6             | 4.16             | 6.08             | 2.74       | 74                  | 86.2              |
| mercurio                       | 0.027                                                    | h     | 0.0145              | 0.054            | 0.0176           | 0.013            | 0.0124     | 0.044               | 0.0121            |
| molibdeno                      | 1.352                                                    |       | 0.059               | 0.117            | 0.167            | 0.048            | 0.163      | 0.329               | 1.14              |
| níquel                         | 5.4                                                      | s     | 0.28                | 0.5              | 0.78             | <0.20            | 0.96       | 2.46                | 2.54              |
| selenio                        | 1.352                                                    |       | 0.343               | 0.436            | 0.417            | 0.495            | 0.45       | 0.504               | 0.416             |
| estroncio                      | 162.2                                                    |       | 43.3                | 37.1             | 52.7             | 70.9             | 39.8       | 47                  | 68.5              |
| talio                          | 0.0175                                                   | s     | <0.010              | <0.020           | <0.010           | <0.020           | <0.010     | <0.020              | <0.020            |
| estaño                         | 162.2                                                    |       | <0.050              | <0.10            | <0.050           | <0.10            | <0.050     | <0.10               | <0.10             |
| uranio                         | 0.812                                                    | s     | <0.0020             | <0.0040          | <0.0020          | <0.0040          | <0.0020    | <0.0040             | 0.0083            |
| vanadio                        | 1.362                                                    |       | <0.10               | <0.20            | 0.11             | <0.20            | 0.11       | 1.47                | 1.89              |
| zinc                           | 81.2                                                     | m     | 16.6                | 18.9             | 18.5             | 22               | 18.3       | 20                  | 14.7              |

Tabla 23      Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)  
(continuación)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | TL HF1 "HOJA"       | TL BFH1            | TL BFH1           | TL SJF1         | TL BFH1         | TL RF1 "RICONCITO" | TL MF1          |
|--------------------------------|----------------------------------------------------------|-------|---------------------|--------------------|-------------------|-----------------|-----------------|--------------------|-----------------|
| Especies/Longitud              |                                                          |       | BOCA CHICA (19.9cm) | LORICARDAL (9.9cm) | LORICARDAL (13cm) | BRYCON (14.3cm) | BRYCON (13.4cm) | BRYCON (14.8cm)    | BRYCON (11.7cm) |
| Fecha de la Muestra            |                                                          |       | 13-Mar-08           | 18-Mar-08          | 18-Mar-08         | 16-Mar-08       | 18-Mar-08       | 13-Mar-08          | 18-Mar-08       |
| Identificación del Laboratorio |                                                          |       | L677662-29          | L677662-30         | L677662-31        | L677662-32      | L677662-33      | L677662-34         | L677662-35      |
| Matriz                         |                                                          |       | Tejido              | Tejido             | Tejido            | Tejido          | Tejido          | Tejido             | Tejido          |
| Parámetros físicos             |                                                          |       |                     |                    |                   |                 |                 |                    |                 |
| % de humedad                   |                                                          |       | 71.9                | 59.6               | 67.6              | 76.1            | 75.9            | 77                 | 75.3            |
| Metales                        |                                                          |       |                     |                    |                   |                 |                 |                    |                 |
| aluminio                       | 270                                                      |       | 534                 | 1390               | 1330              | 133             | 15.5            | 19.1               | 22.7            |
| antimonio                      | 0.108                                                    | m     | <0.010              | <0.010             | <0.030            | <0.010          | <0.020          | <0.020             | <0.020          |
| arsénico                       | 0.021                                                    |       | 0.072               | 0.048              | 0.052             | 0.134           | <0.020          | 0.251              | <0.020          |
| bario                          | 54                                                       |       | 23.4                | 9.39               | 34.1              | 71.5            | 2.99            | 3.36               | 5.24            |
| berilio                        | 0.54                                                     |       | <0.10               | <0.10              | <0.30             | <0.10           | <0.20           | <0.20              | <0.20           |
| bismuto                        | -                                                        |       | <0.030              | <0.030             | <0.090            | <0.030          | <0.060          | <0.060             | <0.060          |
| cadmio                         | 0.27                                                     | d     | 0.0161              | 0.0577             | 0.064             | 0.0228          | 0.079           | 0.084              | 0.071           |
| calcio                         | -                                                        |       | 11,100              | 9,190              | 33,600            | 7,590           | 10,900          | 9,470              | 17,600          |
| cromo                          | 0.812                                                    | p     | 7.8                 | 0.7                | 19.3              | 0.38            | 1.25            | 0.59               | 2.58            |
| cobalto                        | 0.0812                                                   |       | 0.48                | 0.779              | 0.61              | 0.257           | <0.040          | <0.040             | 0.059           |
| cobre                          | 10.82                                                    |       | 2.55                | 14.9               | 39.8              | 0.841           | 1.01            | 1                  | 0.982           |
| plomo                          | -                                                        |       | 0.106               | 0.224              | 0.319             | 0.263           | 0.041           | <0.040             | 0.082           |
| litio                          | 0.54                                                     | l     | <0.10               | 0.13               | <0.30             | <0.10           | <0.20           | <0.20              | <0.20           |
| magnesio                       | -                                                        |       | 433                 | 228                | 637               | 338             | 405             | 388                | 501             |
| manganeso                      | 37.8                                                     | d     | 23.7                | 102                | 43.6              | 35.5            | 16.8            | 6.49               | 40.1            |
| mercurio                       | 0.027                                                    | h     | 0.0146              | 0.0145             | 0.0347            | 0.0173          | 0.0108          | 0.0061             | 0.026           |
| molibdeno                      | 1.352                                                    |       | 1.84                | 0.449              | 1.57              | 0.033           | 0.091           | 0.046              | 0.144           |
| níquel                         | 5.4                                                      | s     | 5.2                 | 0.21               | 10.9              | 0.16            | 0.69            | 0.33               | 1.39            |
| selenio                        | 1.352                                                    |       | 0.282               | 0.276              | 0.443             | 0.257           | 0.172           | 0.348              | 0.22            |
| estroncio                      | 162.2                                                    |       | 39.9                | 16.3               | 89.7              | 17.7            | 40.9            | 36.8               | 48.8            |
| talio                          | 0.0175                                                   | s     | <0.010              | <0.010             | <0.030            | <0.010          | <0.020          | <0.020             | <0.020          |
| estaño                         | 162.2                                                    |       | <0.050              | <0.050             | <0.15             | <0.050          | <0.10           | <0.10              | <0.10           |
| uranio                         | 0.812                                                    | s     | 0.137               | 0.012              | 0.0133            | <0.0020         | <0.0040         | <0.0040            | <0.0040         |
| vanadio                        | 1.362                                                    |       | 3.44                | 3.83               | 3.9               | 0.38            | <0.20           | <0.20              | 0.5             |
| zinc                           | 81.2                                                     | m     | 16.1                | 15                 | 42                | 28.4            | 26.2            | 28.4               | 31.7            |

Tabla 23      Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)  
(continuación)

| Identificación de la Muestra   | Niveles para Peces<br>RBS Región 3 del<br>APAEU <sup>(a)</sup> | Notas | TL SJF1            | TL MF1             | TL BFH1            | TL BFH1            | TL MF1             | MF1                | TL BFH1            | TL MF1        |
|--------------------------------|----------------------------------------------------------------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|
| Especies/Longitud              |                                                                |       | BRYCON<br>(13.3cm) | BRYCON<br>(15.5cm) | BRYCON<br>(14.8cm) | BRYCON<br>(13.7cm) | BRYCON<br>(16.3cm) | BRYCON<br>(17.6cm) | BRYCON<br>(16.3cm) | BRYCON (16cm) |
| Fecha de la Muestra            |                                                                |       | 16-Mar-08          | 18-Mar-08          | 18-Mar-08          | 18-Mar-08          | 18-Mar-08          | 18-Mar-08          | 18-Mar-08          | 18-Mar-08     |
| Identificación del Laboratorio |                                                                |       | L677662-36         | L677662-37         | L677662-38         | L677662-39         | L677662-40         | L677662-41         | L677662-42         | L677662-43    |
| Matriz                         |                                                                |       | Tejido             | Tejido             | Tejido             | Tejido             | Tejido             | Tejido             | Tejido             | Tejido        |
| Parámetros Físicos             |                                                                |       |                    |                    |                    |                    |                    |                    |                    |               |
| % de humedad                   |                                                                |       | 70.2               | 77.4               | 75.8               | 74.4               | 69.1               | 78.3               | 74.2               | 75.8          |
| Metales                        |                                                                |       |                    |                    |                    |                    |                    |                    |                    |               |
| aluminio                       | 270                                                            |       | 68                 | 38                 | 74.4               | 669                | 36.6               | 169                | 14.6               | 24            |
| antimonio                      | 0.108                                                          | m     | 0.013              | <0.010             | <0.010             | <0.020             | <0.010             | <0.010             | <0.010             | <0.010        |
| arsénico                       | 0.021                                                          |       | 0.038              | 0.023              | 0.041              | 0.021              | <0.010             | 0.017              | <0.010             | <0.010        |
| bario                          | 54                                                             |       | 23.4               | 3.28               | 3.83               | 16.9               | 2.2                | 3.26               | 2.33               | 3.4           |
| berilio                        | 0.54                                                           |       | <0.10              | <0.10              | <0.10              | <0.20              | <0.10              | <0.10              | <0.10              | <0.10         |
| bismuto                        | -                                                              |       | <0.030             | <0.030             | <0.030             | <0.060             | <0.030             | <0.030             | <0.030             | <0.030        |
| cadmio                         | 0.27                                                           | d     | 0.0447             | 0.103              | 0.209              | 0.225              | 0.0537             | 0.129              | 0.189              | 0.0796        |
| calcio                         | -                                                              |       | 11,700             | 11,700             | 12,100             | 15,100             | 7,600              | 11,400             | 8,690              | 11,400        |
| cromo                          | 0.812                                                          | p     | 0.58               | 1.28               | 1.13               | 2.48               | 0.6                | 1.23               | 0.76               | 2.92          |
| cobalto                        | 0.0812                                                         |       | 0.114              | 0.043              | 0.044              | 0.294              | 0.038              | 0.072              | <0.020             | 0.073         |
| cobre                          | 10.82                                                          |       | 0.64               | 1.56               | 3.53               | 9.16               | 0.786              | 1.01               | 1.03               | 0.561         |
| plomo                          | -                                                              |       | 0.607              | 0.068              | 0.074              | 0.129              | 0.053              | 0.061              | 0.07               | 0.096         |
| litio                          | 0.54                                                           | l     | <0.10              | <0.10              | <0.10              | <0.20              | <0.10              | <0.10              | <0.10              | <0.10         |
| magnesio                       | -                                                              |       | 403                | 421                | 419                | 507                | 328                | 366                | 316                | 351           |
| manganeso                      | 37.8                                                           | d     | 28.7               | 16.5               | 14                 | 48.8               | 22.8               | 23.7               | 12.9               | 21.1          |
| mercurio                       | 0.027                                                          | h     | 0.0049             | 0.137              | 0.0194             | 0.0218             | 0.0617             | 0.0524             | 0.0203             | 0.102         |
| molibdeno                      | 1.352                                                          |       | 0.038              | 0.174              | 0.114              | 0.363              | 0.055              | 0.09               | 0.08               | 0.23          |
| níquel                         | 5.4                                                            | s     | 0.26               | 0.66               | 0.65               | 1.35               | 0.3                | 0.6                | 0.38               | 1.53          |
| selenio                        | 1.352                                                          |       | 0.18               | 0.253              | 0.106              | 0.147              | 0.393              | 0.225              | 0.242              | 0.185         |
| estroncio                      | 162.2                                                          |       | 35.3               | 29.6               | 39.5               | 47.8               | 18.3               | 28.6               | 29.5               | 29.8          |
| talio                          | 0.0175                                                         | s     | <0.010             | <0.010             | <0.010             | <0.020             | <0.010             | <0.010             | <0.010             | <0.010        |
| estaño                         | 162.2                                                          |       | <0.050             | <0.050             | <0.050             | <0.10              | <0.050             | <0.050             | <0.050             | <0.050        |
| uranio                         | 0.812                                                          | s     | <0.0020            | <0.0020            | <0.0020            | 0.0059             | <0.0020            | <0.0020            | <0.0020            | <0.0020       |
| vanadio                        | 1.362                                                          |       | 0.25               | 0.22               | 0.15               | 1.28               | 0.55               | 0.64               | <0.10              | 0.17          |
| zinc                           | 81.2                                                           | m     | 22.8               | 26.3               | 24                 | 32.6               | 18.6               | 21.2               | 18.4               | 21.9          |



Tabla 23      Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)  
(continuación)

| Identificación de la Muestra   | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | TL MF1        | TL H4/W4        | TL MF1        | TL RF1          | RL 620.0G "CAIMITO"   | FL CF1 "CAIMITO"      | 349.0G "CAIMITO"       | 449.3G "CAIMITO"       |
|--------------------------------|----------------------------------------------------------|-------|---------------|-----------------|---------------|-----------------|-----------------------|-----------------------|------------------------|------------------------|
| Especies/Longitud              |                                                          |       | BRYCON (14cm) | BRYCON (13.2cm) | BRYCON (16cm) | BRYCON (17.2cm) | CARANX LOTUS (32.1cm) | CARANX LATUS (21.6cm) | CARANX CRISUS (27.5cm) | CARANX CRISUS (30.0cm) |
| Fecha de la Muestra            |                                                          |       | 18-Mar-08     | 16-Mar-08       | 18-Mar-08     | 13-Mar-08       | 10-Mar-08             | 11-Mar-08             | 10-Mar-08              | 10-Mar-08              |
| Identificación del Laboratorio |                                                          |       | L677662-44    | L677662-45      | L677662-46    | L677662-47      | L677662-48            | L677662-49            | L677662-50             | L677662-51             |
| Matriz                         |                                                          |       | Tejido        | Tejido          | Tejido        | Tejido          | Tejido                | Tejido                | Tejido                 | Tejido                 |
| <b>Parámetros Físicos</b>      |                                                          |       |               |                 |               |                 |                       |                       |                        |                        |
| % de humedad                   |                                                          |       | 73.4          | 78.3            | 78.8          | 71              | 72                    | 74.2                  | 73.5                   | 72                     |
| <b>Metales</b>                 |                                                          |       |               |                 |               |                 |                       |                       |                        |                        |
| aluminio                       | <u>270</u>                                               |       | 45.7          | 51.3            | 39.9          | 3.9             | 11.7                  | 5.7                   | 8.1                    | 4.3                    |
| antimonio                      | <u>0.108</u>                                             | m     | <0.010        | <0.010          | <0.010        | <0.010          | <0.020                | <0.010                | <0.020                 | <0.010                 |
| arsénico                       | <u>0.021</u>                                             |       | 0.016         | <u>0.218</u>    | <0.010        | <u>0.145</u>    | <u>0.763</u>          | <u>0.633</u>          | <u>1.23</u>            | <u>1.19</u>            |
| bario                          | <u>54</u>                                                |       | 3.58          | 2.71            | 2.07          | 1.66            | 0.472                 | 2.92                  | 0.557                  | 0.283                  |
| berilio                        | <u>0.54</u>                                              |       | <0.10         | <0.10           | <0.10         | <0.10           | <0.20                 | <0.10                 | <0.20                  | <0.10                  |
| bismuto                        | -                                                        |       | <0.030        | <0.030          | <0.030        | <0.030          | <0.060                | <0.030                | <0.060                 | <0.030                 |
| cadmio                         | <u>0.27</u>                                              | d     | 0.0844        | 0.0193          | 0.0771        | 0.106           | <0.010                | 0.0132                | 0.041                  | 0.0145                 |
| calcio                         | -                                                        |       | 11,600        | 9,070           | 8,220         | 6,060           | 12,800                | 7,500                 | 12,200                 | 8,660                  |
| cromo                          | <u>0.812</u>                                             | p     | 0.78          | 0.44            | <u>0.98</u>   | 0.48            | <0.20                 | <u>0.99</u>           | 0.58                   | 0.11                   |
| cobalto                        | <u>0.0812</u>                                            |       | 0.025         | 0.044           | 0.038         | <0.020          | <0.040                | 0.028                 | <0.040                 | <0.020                 |
| cobre                          | <u>10.82</u>                                             |       | 1.29          | 0.668           | 0.618         | 0.738           | 0.518                 | 0.615                 | 0.731                  | 0.911                  |
| plomo                          | -                                                        |       | 0.058         | 0.081           | 0.056         | <0.020          | <0.040                | 0.132                 | <0.040                 | <0.020                 |
| litio                          | <u>0.54</u>                                              | l     | <0.10         | <0.10           | <0.10         | <0.10           | <0.20                 | <0.10                 | <0.20                  | <0.10                  |
| magnesio                       | -                                                        |       | 423           | 359             | 314           | 342             | 449                   | 325                   | 463                    | 408                    |
| manganeso                      | <u>37.8</u>                                              | d     | 18.7          | 24.1            | 14.7          | 4.88            | 1.18                  | 1.88                  | 0.891                  | 1.02                   |
| mercurio                       | <u>0.027</u>                                             | h     | <u>0.0339</u> | 0.0265          | 0.0216        | 0.0098          | <u>0.0436</u>         | 0.04                  | <u>0.139</u>           | <u>0.117</u>           |
| molibdeno                      | <u>1.352</u>                                             |       | 0.073         | 0.037           | 0.082         | 0.038           | 0.027                 | 0.085                 | 0.06                   | 0.019                  |
| níquel                         | <u>5.4</u>                                               | s     | 0.38          | 0.23            | 0.51          | 0.23            | 0.21                  | 0.61                  | 0.33                   | <0.10                  |
| selenio                        | <u>1.352</u>                                             |       | 0.216         | 0.343           | 0.162         | 0.5             | 0.592                 | 0.534                 | 0.989                  | 0.918                  |
| estroncio                      | <u>162.2</u>                                             |       | 29.5          | 25.3            | 20.2          | 21              | 72.4                  | 24.9                  | 60                     | 34.6                   |
| talio                          | <u>0.0175</u>                                            | s     | <0.010        | <0.010          | <0.010        | <0.010          | <0.020                | <0.010                | <0.020                 | <0.010                 |
| estaño                         | <u>162.2</u>                                             |       | <0.050        | <0.050          | <0.050        | <0.050          | <0.10                 | 0.062                 | <0.10                  | <0.050                 |
| uranio                         | <u>0.812</u>                                             | s     | <0.0020       | <0.0020         | <0.0020       | <0.0020         | 0.0042                | <0.0020               | 0.0072                 | 0.0045                 |
| vanadio                        | <u>1.362</u>                                             |       | 0.23          | 0.56            | 0.29          | <0.10           | <0.20                 | <0.10                 | <0.20                  | <0.10                  |
| zinc                           | <u>81.2</u>                                              | m     | 27.9          | 33.8            | 16.9          | 18.8            | 13.2                  | 10.6                  | 20.4                   | 16.5                   |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008); Normas específicas del sitio: m = metálico; d = dieta; p = partículas de cromo VI; i = sales inorgánicas; s = sales solubles; h = metilmercurio.

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |                                                                                    |
|------------|------------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo.                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo. |

**Tabla 24**      **Tabla de Análisis de Línea Base de Bifenilos Policlorados en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)**

| Identificación de la Muestra   | Niveles para Peces RBS<br>Región 3 del APAEU<br>(a) | TL H4/W4         | TL HF1 "HOJA"       | TL RF1          | RL 620.0G "CAIMITO"   |
|--------------------------------|-----------------------------------------------------|------------------|---------------------|-----------------|-----------------------|
| Especies/ Longitud             |                                                     | GUABINA (21.8cm) | BOCA CHICA (19.9cm) | BRYCON (17.2cm) | CARANX LOTUS (32.1cm) |
| Fecha de la Muestra            |                                                     | 16-Mar-08        | 13-Mar-08           | 13-Mar-08       | 10-Mar-08             |
| Identificación del Laboratorio |                                                     | L677662-9        | L677662-29          | L677662-47      | L677662-48            |
| Matriz                         |                                                     | Tejido           | Tejido              | Tejido          | Tejido                |
| Bifenilos Policlorados         |                                                     |                  |                     |                 |                       |
| PCB-1016                       | <u>0.451</u>                                        | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1221                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1232                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1242                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1248                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1254                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1260                       | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <u>0.078</u>          |
| PCB-1262                       |                                                     | <0.050           | <0.050              | <0.050          | <0.050                |
| PCB-1268                       |                                                     | <0.050           | <0.050              | <0.050          | <0.050                |
| Total PCB                      | <u>0.0158</u>                                       | <0.050           | <0.050              | <0.050          | <u>0.078</u>          |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008)

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|                   |
|-------------------|
| <b><u>500</u></b> |
| 500               |

Igual o mayor al nivel de análisis en base al riesgo.

El límite de detección del método es mayor al nivel de análisis en base al riesgo.

**Tabla 25**      **Tabla de Análisis de Línea Base de Pesticidas Organoclorados en Tejidos Musculares de Peces de Agua Dulce/Estuarios para la Evaluación de Riesgos a la Salud Humana y a la Ecología (2008)**

| Identificación de la Muestra            | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | TL H4/W4         | TL HF1 "HOJA"       | TL RF1          | RL 620.0G "CAIMITO"   |
|-----------------------------------------|-------------------------------------------------------------|------------------|---------------------|-----------------|-----------------------|
| Especies/Longitud                       |                                                             | GUABINA (21.8cm) | BOCA CHICA (19.9cm) | BRYCON (17.2cm) | CARANX LOTUS (32.1cm) |
| Fecha de la Muestra                     |                                                             | 16-Mar-08        | 13-Mar-08           | 13-Mar-08       | 10-Mar-08             |
| Identificación del Laboratorio          |                                                             | L677662-9        | L677662-29          | L677662-47      | L677662-48            |
| Matriz                                  |                                                             | Tejido           | Tejido              | Tejido          | Tejido                |
| <b><i>Pesticidas Organoclorados</i></b> |                                                             |                  |                     |                 |                       |
| aldrín                                  | <u>0.00186</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| alfa-BHC                                | <u>0.00501</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| beta-BHC                                | <u>0.0175</u>                                               | <0.20            | <0.20               | <0.20           | <0.20                 |
| lindano (gama-BHC)                      | <u>0.0287</u>                                               | <0.20            | <0.20               | <0.20           | <0.20                 |
| delta-BHC                               |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| cisclordano (alfa)                      |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| transclordano (gama)                    |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| 2,4'-DDD                                |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| 4,4'-DDD                                | <u>0.131</u>                                                | <0.20            | <0.20               | <0.20           | <0.20                 |
| 2,4'-DDE                                |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| 4,4'-DDE                                | <u>0.0928</u>                                               | <0.20            | <0.20               | <0.20           | <0.20                 |
| 2,4'-DDT                                |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| 4,4'-DDT                                | <u>0.0928</u>                                               | <0.20            | <0.20               | <0.20           | <0.20                 |
| dieldrín                                | <u>0.00197</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| endosulfán I                            |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| endosulfán II                           |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| endosulfán sulfato                      |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| endrina                                 | <u>0.0812</u>                                               | <0.20            | <0.20               | <0.20           | <0.20                 |
| heptacloro                              | <u>0.00701</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| epóxido de heptacloro                   | <u>0.00347</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| metoxicloro                             | <u>1.352</u>                                                | <0.20            | <0.20               | <0.20           | <0.20                 |
| mirex                                   | <u>0.00175</u>                                              | <0.20            | <0.20               | <0.20           | <0.20                 |
| cisnonacloro                            |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| transnonacloro                          |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |
| oxiclordano                             |                                                             | <0.20            | <0.20               | <0.20           | <0.20                 |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008).

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |
|------------|
| <b>500</b> |
| 500        |

Igual o mayor al nivel de análisis en base al riesgo.

El límite de detección del método es mayor al nivel de análisis en base al riesgo.

Tabla 26 Tabla de Análisis de Línea Base de Metales en Tejidos Musculares de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Identificación de la Muestra   | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | Notas | RAYA 1      | RAYA 2        | RAYA 3        | PEZ 1        | PEZ 2        | PEZ 3        | PEZ 4         | PEZ 5         | PEZ 6         | PEZ 7        |
|--------------------------------|-------------------------------------------------------------|-------|-------------|---------------|---------------|--------------|--------------|--------------|---------------|---------------|---------------|--------------|
| Especies/<br>Longitud          |                                                             |       |             |               |               |              |              |              |               |               |               |              |
| Fecha de la Muestra            |                                                             |       |             |               |               |              |              |              |               |               |               |              |
| Identificación del Laboratorio |                                                             |       | L680075-1   | L680075-2     | L680075-3     | L680075-4    | L680075-5    | L680075-6    | L680075-7     | L680075-8     | L680075-9     | L680075-10   |
| Matriz                         |                                                             |       | Tejido      | Tejido        | Tejido        | Tejido       | Tejido       | Tejido       | Tejido        | Tejido        | Tejido        | Tejido       |
| Parámetros Físicos             |                                                             |       |             |               |               |              |              |              |               |               |               |              |
| % de humedad                   |                                                             |       | 78.3        | 71.4          | 76.8          | 65.5         | 61.9         | 54.8         | 68.2          | 54.4          | 67            | 59.9         |
| Metales                        |                                                             |       |             |               |               |              |              |              |               |               |               |              |
| aluminio                       | <u>270</u>                                                  |       | 3.3         | 5.5           | 3             | 24.4         | 15.1         | 4.4          | 45            | 7.7           | 84.6          | 53.1         |
| antimonio                      | <u>0.108</u>                                                | m     | <0.010      | <0.010        | <0.010        | <0.040       | <0.020       | <0.010       | <0.020        | <0.020        | <0.020        | <0.030       |
| arsénico                       | <u>0.021</u>                                                |       | <u>4.37</u> | <u>7.77</u>   | <u>8.78</u>   | <u>2.73</u>  | <u>2.75</u>  | <u>0.671</u> | <u>3.08</u>   | <u>0.624</u>  | <u>1.75</u>   | <u>1.95</u>  |
| bario                          | <u>54</u>                                                   |       | 0.042       | 0.367         | 0.127         | 2.36         | 3.11         | 2.55         | 0.86          | 1.87          | 0.752         | 3.06         |
| berilio                        | <u>0.54</u>                                                 |       | <0.10       | <0.10         | <0.10         | <0.40        | <0.20        | <0.10        | <0.20         | <0.20         | <0.20         | <0.30        |
| bismuto                        | -                                                           |       | <0.030      | <0.030        | <0.030        | <0.12        | <0.060       | <0.030       | <0.060        | <0.060        | <0.060        | <0.090       |
| cadmio                         | <u>0.27</u>                                                 | d     | <0.0050     | <0.0050       | <0.0050       | 0.039        | 0.03         | 0.0113       | <0.010        | 0.012         | 0.014         | 0.016        |
| calcio                         | -                                                           |       | 102         | 1,810         | 152           | 25,500       | 19,100       | 19,600       | 16,200        | 13,100        | 15,300        | 23700        |
| cromo                          | <u>0.812</u>                                                | p     | 0.17        | 0.49          | 0.21          | 0.47         | <u>1.3</u>   | 0.26         | 0.29          | 0.21          | <u>0.98</u>   | <u>1.27</u>  |
| cobalto                        | <u>0.0812</u>                                               |       | <0.020      | <0.020        | <0.020        | <0.080       | <0.040       | <0.020       | <0.040        | 0.069         | <0.040        | <0.060       |
| cobre                          | <u>10.82</u>                                                |       | 0.177       | 0.43          | 0.225         | 0.752        | 0.783        | 0.358        | 2.34          | 0.433         | 0.582         | 0.599        |
| plomo                          | -                                                           |       | <0.020      | <0.020        | 0.036         | <0.080       | <0.040       | <0.020       | <0.040        | <0.040        | 0.045         | <0.060       |
| litio                          | <u>0.54</u>                                                 | l     | <0.10       | <0.10         | <0.10         | <0.40        | <0.20        | <0.10        | <0.20         | <0.20         | <0.20         | <0.30        |
| magnesio                       | -                                                           |       | 246         | 258           | 219           | 649          | 580          | 441          | 521           | 453           | 531           | 625          |
| manganeso                      | <u>37.8</u>                                                 | d     | 0.116       | 0.618         | 0.164         | 8.9          | 9.38         | 9.92         | 3.76          | 5.71          | 14.3          | 6.32         |
| mercurio                       | <u>0.027</u>                                                | h     | <u>0.37</u> | <u>0.0627</u> | <u>0.0366</u> | <u>0.181</u> | <u>0.118</u> | 0.0267       | <u>0.0966</u> | <u>0.0506</u> | <u>0.0617</u> | <u>0.128</u> |
| molibdeno                      | <u>1.352</u>                                                |       | 0.013       | 0.038         | 0.017         | <0.040       | 0.02         | 0.033        | 0.042         | 0.024         | <0.020        | <0.030       |
| níquel                         | <u>5.4</u>                                                  | s     | <0.10       | 0.29          | 0.12          | <0.40        | 0.65         | 0.21         | <0.20         | <0.20         | 0.43          | 0.54         |
| selenio                        | <u>1.352</u>                                                |       | 0.341       | 0.54          | 0.375         | 0.513        | 0.577        | 0.538        | 1.05          | 0.644         | 0.444         | 0.47         |
| estroncio                      | <u>162.2</u>                                                |       | 0.412       | 13.4          | 1.05          | 90.7         | 45.8         | 22.3         | 80.9          | 15            | 64.6          | 79.4         |
| talio                          | <u>0.0175</u>                                               | s     | <0.010      | <0.010        | <0.010        | <0.040       | <0.020       | <0.010       | <0.020        | <0.020        | <0.020        | <0.030       |
| estaño                         | <u>162.2</u>                                                |       | <0.050      | <0.050        | <0.050        | <0.20        | <0.10        | <0.050       | <0.10         | <0.10         | <0.10         | <0.15        |
| uranio                         | <u>0.812</u>                                                | s     | <0.0020     | <0.0020       | <0.0020       | 0.0301       | 0.0114       | 0.0104       | 0.0045        | 0.0058        | 0.0128        | 0.0193       |
| vanadio                        | <u>1.362</u>                                                |       | <0.10       | <0.10         | <0.10         | <0.40        | 0.23         | 0.14         | 0.21          | <0.20         | 0.29          | <0.30        |
| zinc                           | <u>81.2</u>                                                 | m     | 3.5         | 5.92          | 3.85          | 38           | 29.8         | 27.7         | 12.7          | 28.4          | 22            | 32.9         |

Tabla 26 Tabla de Análisis de Línea Base de Metales en Tejido Muscular de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Identificación de la Muestra   | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | Notas | PEZ 8        | PEZ 9         | DIAPTERUS PLUMIEN #1 | DIAPTERUS PLUMIEN #2 | DIAPTERUS PLUMIEN #3 | DIAPTERUS PLUMIEN #4 | DIAPTERUS PLUMIEN #5 | DIAPTERUS PLUMIEN #6 | DIAPTERUS PLUMIEN #7 | DIAPTERUS PLUMIEN #8 |
|--------------------------------|-------------------------------------------------------------|-------|--------------|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Especies/Longitud              |                                                             |       |              |               |                      |                      |                      |                      |                      |                      |                      |                      |
| Fecha de la Muestra            |                                                             |       |              |               | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            | 12-Nov-07            |
| Identificación del Laboratorio |                                                             |       | L680075-11   | L680075-12    | L680075-13           | L680075-14           | L680075-15           | L680075-16           | L680075-17           | L680075-18           | L680075-19           | L680075-20           |
| Matriz                         |                                                             |       | Tejido       | Tejido        | Tejido               | Tejido               | Tejido               | Tejido               | Tejido               | Tejido               | Tejido               | Tejido               |
| Parámetros Físicos             |                                                             |       |              |               |                      |                      |                      |                      |                      |                      |                      |                      |
| % de humedad                   |                                                             |       | 63.1         | 66.7          | 69.4                 | 62.1                 | 70.4                 | 60.3                 | 67.2                 | 54.8                 | 67.1                 | 69.1                 |
| Metales                        |                                                             |       |              |               |                      |                      |                      |                      |                      |                      |                      |                      |
| aluminio                       | <u>270</u>                                                  |       | 23.1         | 15.8          | 38.4                 | 47.6                 | 38.5                 | 7.2                  | <6.0                 | <40                  | <6.0                 | 9.6                  |
| antimonio                      | <u>0.108</u>                                                | m     | <0.020       | <0.030        | <0.030               | <0.030               | <0.030               | <0.020               | <0.030               | <0.20                | <0.030               | <0.030               |
| arsénico                       | <u>0.021</u>                                                |       | <u>2.35</u>  | <u>3.36</u>   | <u>2.53</u>          | <u>0.33</u>          | <u>1.45</u>          | <u>0.96</u>          | <u>0.225</u>         | <u>0.68</u>          | <u>0.933</u>         | <u>1.49</u>          |
| bario                          | <u>54</u>                                                   |       | 2.32         | 2.05          | 2.6                  | 2.16                 | 3.4                  | 3.39                 | 0.708                | 2.68                 | 4.48                 | 3.62                 |
| berilio                        | <u>0.54</u>                                                 |       | <0.20        | <0.30         | <0.30                | <0.30                | <0.30                | <0.20                | <0.30                | <2.0                 | <0.30                | <0.30                |
| bismuto                        | -                                                           |       | <0.060       | <0.090        | <0.090               | <0.090               | <0.090               | <0.060               | <0.090               | <0.60                | <0.090               | <0.090               |
| cadmio                         | <u>0.27</u>                                                 | d     | 0.025        | 0.017         | <0.015               | <0.015               | <0.015               | <0.010               | <0.015               | <0.10                | <0.015               | <0.015               |
| calcio                         | -                                                           |       | 19,900       | 23,400        | 26,300               | 24,700               | 22,200               | 19,800               | 23,500               | 22,000               | 24,400               | 23200                |
| cromo                          | <u>0.812</u>                                                | p     | 0.28         | 0.37          | 0.38                 | <0.30                | 0.45                 | 0.25                 | <0.30                | <2.0                 | <0.30                | 0.4                  |
| cobalto                        | <u>0.0812</u>                                               |       | <0.040       | <0.060        | <0.060               | <0.060               | <0.060               | <0.040               | <0.060               | <0.40                | <0.060               | <0.060               |
| cobre                          | <u>10.82</u>                                                |       | 0.647        | 0.496         | 0.657                | 0.841                | 0.488                | 0.417                | 0.364                | 0.44                 | 0.424                | 0.437                |
| plomo                          | -                                                           |       | 0.226        | <0.060        | <0.060               | <0.060               | <0.060               | <0.040               | <0.060               | <0.40                | <0.060               | <0.060               |
| litio                          | <u>0.54</u>                                                 | l     | <0.20        | <0.30         | <0.30                | <0.30                | <0.30                | <0.20                | <0.30                | <2.0                 | <0.30                | <0.30                |
| magnesio                       | -                                                           |       | 558          | 621           | 660                  | 617                  | 651                  | 570                  | 616                  | 565                  | 635                  | 603                  |
| manganeso                      | <u>37.8</u>                                                 | d     | 6.59         | 6.66          | 9.8                  | 15.9                 | 9.85                 | 11.9                 | 2.33                 | 10.2                 | 11.3                 | 10.2                 |
| mercurio                       | <u>0.027</u>                                                | h     | <u>0.137</u> | <u>0.0695</u> | <u>0.0989</u>        | <u>0.0389</u>        | <u>0.0852</u>        | <u>0.0478</u>        | 0.0119               | 0.0267               | <u>0.0688</u>        | <u>0.115</u>         |
| molibdeno                      | <u>1.352</u>                                                |       | 0.04         | 0.039         | 0.04                 | <0.030               | 0.053                | 0.024                | <0.030               | <0.20                | <0.030               | 0.046                |
| níquel                         | <u>5.4</u>                                                  | s     | <0.20        | <0.30         | <0.30                | <0.30                | <0.30                | <0.20                | <0.30                | <2.0                 | <0.30                | <0.30                |
| selenio                        | <u>1.352</u>                                                |       | 0.646        | 0.503         | 0.494                | 0.366                | 0.492                | 0.385                | 0.373                | 0.493                | 0.453                | 0.581                |
| estroncio                      | <u>162.2</u>                                                |       | 48.4         | 65.8          | 54                   | 105                  | 38.9                 | 25                   | 94.7                 | 23.9                 | 51.4                 | 51.8                 |
| talio                          | <u>0.0175</u>                                               | s     | <0.020       | <0.030        | <0.030               | <0.030               | <0.030               | <0.020               | <0.030               | <0.20                | <0.030               | <0.030               |
| estaño                         | <u>162.2</u>                                                |       | <0.10        | <0.15         | <0.15                | <0.15                | <0.15                | <0.10                | <0.15                | <1.0                 | <0.15                | <0.15                |
| uranio                         | <u>0.812</u>                                                | s     | 0.0159       | 0.0079        | 0.0069               | 0.0066               | 0.01                 | 0.0068               | <0.0060              | <0.040               | 0.0071               | <0.0060              |
| vanadio                        | <u>1.362</u>                                                |       | 0.3          | <0.30         | 0.38                 | <0.30                | 0.44                 | 0.3                  | <0.30                | <2.0                 | <0.30                | <0.30                |
| zinc                           | <u>81.2</u>                                                 | m     | 34.1         | 32.6          | 35.4                 | 39.1                 | 33.2                 | 38                   | 33.9                 | 31.1                 | 34.8                 | 36.5                 |

Tabla 26 Tabla de Análisis de Línea Base de Metales en Tejido Muscular de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Identificación de la Muestra   | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | Notas | DIAPTERUS<br>PLUMIEN #9 | DIAPTERUS<br>PLUMIEN #10 | RED DE<br>ENMALLE #13 | Pez #1    | Pez #2    | Pez #3    | Pez #4    | Pez #5    | Pez #6    | UUPRO (UFI) |
|--------------------------------|-------------------------------------------------------------|-------|-------------------------|--------------------------|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| Especies/ Longitud             |                                                             |       |                         |                          |                       |           |           |           |           |           |           |             |
| Fecha de la Muestra            |                                                             |       | 12-Nov-07               | 12-Nov-07                |                       |           |           |           |           |           |           |             |
| Identificación del Laboratorio |                                                             |       | L680075-21              | L680075-22               | L693392-1             | L693392-2 | L693392-3 | L693392-4 | L693392-5 | L693392-6 | L693392-7 | L693392-8   |
| Matriz                         |                                                             |       | Tejido                  | Tejido                   | Tejido                | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido      |
| Parámetros Físicos             |                                                             |       |                         |                          |                       |           |           |           |           |           |           |             |
| % de humedad                   |                                                             |       | 72.8                    | 69.9                     | 71.8                  | 73.4      | 75.3      | 69.8      | 72.4      | 63.6      | 67.6      | 75.3        |
| Metales                        |                                                             |       |                         |                          |                       |           |           |           |           |           |           |             |
| aluminio                       | 270                                                         |       | 28.8                    | 8.6                      | 20.1                  | 2.7       | 10.5      | 5.7       | 30.6      | 7.1       | 11.4      | 7.5         |
| antimonio                      | 0.108                                                       | m     | <0.020                  | <0.020                   | <0.010                | <0.010    | <0.010    | <0.010    | <0.020    | <0.020    | <0.030    | <0.020      |
| arsénico                       | 0.021                                                       |       | 0.32                    | 1.02                     | 1.45                  | 0.335     | 0.935     | 2.93      | 1.05      | 2.62      | 2.34      | 0.305       |
| bario                          | 54                                                          |       | 2.08                    | 3.13                     | 2.56                  | 0.351     | 1.32      | 1.02      | 2.82      | 2.17      | 2.93      | 11.9        |
| berilio                        | 0.54                                                        |       | <0.20                   | <0.20                    | <0.10                 | <0.10     | <0.10     | <0.10     | <0.20     | <0.20     | <0.30     | <0.20       |
| bismuto                        | -                                                           |       | <0.060                  | <0.060                   | <0.030                | <0.030    | <0.030    | <0.030    | <0.060    | <0.060    | <0.090    | <0.060      |
| cadmio                         | 0.27                                                        | d     | <0.010                  | 0.016                    | 0.0175                | 0.0165    | 0.0061    | 0.0168    | 0.015     | 0.026     | 0.027     | 0.147       |
| calcio                         | -                                                           |       | 21,000                  | 23,400                   | 12,000                | 8,250     | 10,700    | 10,400    | 18,300    | 14,400    | 24,600    | 14500       |
| cromo                          | 0.812                                                       | p     | 0.22                    | 0.33                     | 0.3                   | <0.10     | 0.13      | <0.10     | <0.20     | <0.20     | <0.30     | <0.20       |
| cobalto                        | 0.0812                                                      |       | <0.040                  | <0.040                   | 0.026                 | <0.020    | 0.022     | <0.020    | <0.040    | 0.051     | <0.060    | <0.040      |
| cobre                          | 10.82                                                       |       | 0.655                   | 0.43                     | 1.92                  | 0.479     | 0.403     | 0.432     | 0.865     | 0.538     | 0.532     | 0.626       |
| plomo                          | -                                                           |       | <0.040                  | <0.040                   | 0.429                 | <0.020    | 0.06      | <0.020    | <0.040    | <0.040    | <0.060    | <0.040      |
| litio                          | 0.54                                                        | l     | <0.20                   | <0.20                    | <0.10                 | <0.10     | <0.10     | <0.10     | <0.20     | <0.20     | <0.30     | <0.20       |
| magnesio                       | -                                                           |       | 564                     | 628                      | 398                   | 347       | 411       | 380       | 523       | 463       | 629       | 468         |
| manganeso                      | 37.8                                                        | d     | 5.78                    | 10.6                     | 3.47                  | 0.589     | 3.78      | 3.22      | 8.91      | 8.27      | 12.3      | 6.29        |
| mercurio                       | 0.027                                                       | h     | 0.0917                  | 0.133                    | 0.117                 | 0.158     | 0.0549    | 0.0574    | 0.108     | 0.0854    | 0.0934    | 0.0405      |
| molibdeno                      | 1.352                                                       |       | 0.024                   | 0.026                    | 0.044                 | 0.01      | <0.010    | <0.010    | <0.020    | <0.020    | <0.030    | 0.052       |
| níquel                         | 5.4                                                         | s     | <0.20                   | <0.20                    | 0.26                  | <0.10     | <0.10     | <0.10     | <0.20     | <0.20     | <0.30     | <0.20       |
| selenio                        | 1.352                                                       |       | 0.589                   | 0.51                     | 1.24                  | 0.69      | 0.64      | 0.672     | 0.834     | 0.618     | 0.536     | 0.524       |
| estroncio                      | 162.2                                                       |       | 88.3                    | 51.4                     | 50.3                  | 33.4      | 24.4      | 34.1      | 59.1      | 41.5      | 82.1      | 76.1        |
| talio                          | 0.0175                                                      | s     | <0.020                  | <0.020                   | <0.010                | <0.010    | <0.010    | <0.010    | <0.020    | <0.020    | <0.030    | <0.020      |
| estaño                         | 162.2                                                       |       | <0.10                   | <0.10                    | <0.050                | 0.084     | <0.050    | <0.050    | <0.10     | <0.10     | <0.15     | <0.10       |
| uranio                         | 0.812                                                       | s     | 0.0087                  | 0.0147                   | 0.0024                | 0.0022    | 0.0051    | 0.0056    | 0.0113    | 0.0068    | 0.017     | <0.0040     |
| vanadio                        | 1.362                                                       |       | <0.20                   | <0.20                    | 0.28                  | <0.10     | 0.2       | <0.10     | 0.32      | 0.23      | <0.30     | 0.21        |
| zinc                           | 81.2                                                        | m     | 30.9                    | 30.4                     | 10.1                  | 10.9      | 19.6      | 17.9      | 31.6      | 29.5      | 37.3      | 39.9        |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008); Normas específicas del sitio: m = metálico; d = dieta; p = partículas de cromo VI; i = sales inorgánicas; s = sales solubles; h = metilmercurio.

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |                                                                                   |
|------------|-----------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo |

Tabla 27      Tablas de Análisis de Línea Base de Hidrocarburos Aromáticos Policíclicos en Tejidos Musculares de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Identificación de la Muestra                        | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | RAYA 1    | PEZ 2     | DIAPTERUS PLUMIEN #10 | RED DE ENMALLE #13 | Pez #1    | Pez #2    | Pez #3    | Pez #4    | Pez #5    | Pez #6    | UUPRO (UFI) |
|-----------------------------------------------------|-------------------------------------------------------------|-----------|-----------|-----------------------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| Especies/Longitud                                   |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| Fecha de la Muestra                                 |                                                             |           |           | 12-Nov-07             |                    |           |           |           |           |           |           |             |
| Identificación del Laboratorio                      |                                                             | L680075-1 | L680075-5 | L680075-22            | L693392-1          | L693392-2 | L693392-3 | L693392-4 | L693392-5 | L693392-6 | L693392-7 | L693392-8   |
| Matriz                                              |                                                             | Tejido    | Tejido    | Tejido                | Tejido             | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido      |
| <b><i>Hidrocarburos Aromáticos Policíclicos</i></b> |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| acenafteno                                          | <b><u>16.22</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| acenaftileno                                        |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| antraceno                                           | <b><u>81.2</u></b>                                          | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| benzo(a)antraceno                                   | <b><u>0.0432</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| benzo(a)pireno                                      | <b><u>0.00432</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| benzo(b)fluoranteno                                 | <b><u>0.0432</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| benzo(g,h,i)perileno                                |                                                             | <0.010    | <0.015    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| benzo(k)fluoranteno                                 | <b><u>0.432</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| criseno                                             | <b><u>4.32</u></b>                                          | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| dibenzo(a,h)antraceno                               | <b><u>0.00432</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| fluoranteno                                         | <b><u>10.82</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| fluoreno                                            | <b><u>10.82</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| indeno(1,2,3-c,d)pireno                             | <b><u>0.0432</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| naftaleno                                           | <b><u>5.4</u></b>                                           | <0.010    | <0.010    | <0.010                | <0.020             | <0.010    | 0.025     | <0.010    | <0.020    | <0.020    | 0.015     | <0.010      |
| fenantreno                                          |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| pireno                                              | <b><u>8.12</u></b>                                          | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008).  
Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |                                                                                    |
|------------|------------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo.                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo. |

Tabla 28: Tablas de Análisis de Línea Base de Bifenilos Policlorados en Tejidos Musculares de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Identificación de la Muestra   | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | RAYA 1    | PEZ 2     | DIAPTERUS PLUMIEN #10 | RED DE ENMALLE #13 | Pez #1    | Pez #2    | Pez #3    | Pez #4    | Pez #5    | Pez #6    | UUPRO (UFI) |
|--------------------------------|-------------------------------------------------------------|-----------|-----------|-----------------------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| Especies/Longitud              |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| Fecha de la Muestra            |                                                             |           |           | 12-Nov-07             |                    |           |           |           |           |           |           |             |
| Identificación del Laboratorio |                                                             | L680075-1 | L680075-5 | L680075-22            | L693392-1          | L693392-2 | L693392-3 | L693392-4 | L693392-5 | L693392-6 | L693392-7 | L693392-8   |
| Matriz                         |                                                             | Tejido    | Tejido    | Tejido                | Tejido             | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido      |
| Bifenilos Policlorados         |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| PCB-1016                       | <u>0.451</u>                                                | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1221                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1232                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1242                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1248                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1254                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1260                       | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1262                       |                                                             | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| PCB-1268                       |                                                             | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |
| Total PCB                      | <u>0.0158</u>                                               | <0.050    | <0.050    | <0.050                | <0.050             | <0.050    | <0.25     | <0.050    | <0.25     | <0.050    | <0.050    | <0.050      |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008).  
Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|     |                                                                                   |
|-----|-----------------------------------------------------------------------------------|
| 500 | Igual o mayor al nivel de análisis en base al riesgo                              |
| 500 | El límite de detección del método es mayor al nivel de análisis en base al riesgo |



Tabla 29      Tablas de Análisis de Línea Base de Pesticidas Organoclorados en Tejidos Musculares de Peces Marinos para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Identificación de la Muestra     | Niveles para Peces RBS<br>Región 3 del APAEU <sup>(a)</sup> | RAYA 1    | PEZ 2     | DIAPTERUS PLUMIEN #10 | RED DE ENMALLE #13 | Pez #1    | Pez #2    | Pez #3    | Pez #4    | Pez #5    | Pez #6    | UUPRO (UFI) |
|----------------------------------|-------------------------------------------------------------|-----------|-----------|-----------------------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| Especies/Longitud                |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| Fecha de la Muestra              |                                                             |           |           | 12-Nov-07             |                    |           |           |           |           |           |           |             |
| Identificación del Laboratorio   |                                                             | L680075-1 | L680075-5 | L680075-22            | L693392-1          | L693392-2 | L693392-3 | L693392-4 | L693392-5 | L693392-6 | L693392-7 | L693392-8   |
| Matriz                           |                                                             | Tejido    | Tejido    | Tejido                | Tejido             | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido    | Tejido      |
| <b>Pesticidas Organoclorados</b> |                                                             |           |           |                       |                    |           |           |           |           |           |           |             |
| aldrín                           | <b><u>0.00186</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| alfa-BHC                         | <b><u>0.00501</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.020    | <0.010    | <0.010    | <0.010    | <0.010      |
| beta-BHC                         | <b><u>0.0175</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.020    | <0.010      |
| lindano (gama-BHC)               | <b><u>0.0287</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.020    | <0.010    | <0.010    | <0.010      |
| delta-BHC                        |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.050    | <0.050    | <0.010    | <0.030    | <0.010      |
| cisclordano (alfa)               |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| transclordano (gama)             |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.020      |
| 2,4'-DDD                         | <b><u>0.131</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| 4,4'-DDD                         |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| 2,4'-DDE                         | <b><u>0.0928</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| 4,4'-DDE                         |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| 2,4'-DDT                         | <b><u>0.0928</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| 4,4'-DDT                         |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.020    | <0.010    | <0.010    | <0.010      |
| dieldrín                         | <b><u>0.00197</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| endosulfán I                     |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| endosulfán II                    |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| endosulfán sulfato               |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| endrina                          | <b><u>0.0812</u></b>                                        | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| heptacloro                       | <b><u>0.00701</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.030    | <0.010    | <0.020    | <0.010    | <0.010      |
| epóxido de heptacloro            | <b><u>0.00347</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| metoxicloro                      | <b><u>1.352</u></b>                                         | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.020    | <0.020    | <0.010    | <0.010    | <0.010      |
| mirex                            | <b><u>0.00175</u></b>                                       | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| cisnonacloro                     |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| transnonacloro                   |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |
| oxiclordano                      |                                                             | <0.010    | <0.010    | <0.010                | <0.010             | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010    | <0.010      |

(a)      Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008).  
Nota:    Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|            |                                                                                    |
|------------|------------------------------------------------------------------------------------|
| <u>500</u> | Igual o mayor al nivel de análisis en base al riesgo.                              |
| 500        | El límite de detección del método es mayor al nivel de análisis en base al riesgo. |

**Tabla 30      Resumen de las Concentraciones de Metales en el Aire - Línea Base**

| <b>Ubicación<br/>Parámetro</b> | <b>Río Caimito</b> | <b>Nueva Lucha</b> | <b>Nuevo Sinai</b> | <b>San Benito</b> |
|--------------------------------|--------------------|--------------------|--------------------|-------------------|
| aluminio                       | 3.00E-02           | 3.98E-02           | 4.64E-02           | 2.63E-02          |
| arsénico                       | 1.10E-03           | 1.46E-03           | 1.70E-03           | 9.64E-04          |
| bario                          | 3.75E-03           | 4.98E-03           | 5.81E-03           | 3.29E-03          |
| cadmio                         | 3.35E-03           | 4.45E-03           | 5.19E-03           | 2.93E-03          |
| cromo                          | 3.00E-04           | 3.98E-04           | 4.65E-04           | 2.63E-04          |
| cobalto                        | 1.50E-03           | 1.99E-03           | 2.32E-03           | 1.31E-03          |
| cobre                          | 3.30E-03           | 4.38E-03           | 5.11E-03           | 2.89E-03          |
| hierro                         | 3.85E-02           | 5.11E-02           | 5.97E-02           | 3.38E-02          |
| plomo                          | 5.03E-03           | 6.68E-03           | 7.79E-03           | 4.41E-03          |
| manganeso                      | 1.00E-04           | 1.33E-04           | 1.55E-04           | 8.76E-05          |
| mercurio                       | 3.50E-03           | 4.65E-03           | 5.42E-03           | 3.07E-03          |
| molibdeno                      | 5.03E-03           | 6.67E-03           | 7.78E-03           | 4.40E-03          |
| níquel                         | 7.38E-03           | 9.79E-03           | 1.14E-02           | 6.46E-03          |
| selenio                        | 3.00E-04           | 3.98E-04           | 4.65E-04           | 2.63E-04          |
| vanadio                        | 9.00E-04           | 1.19E-03           | 1.39E-03           | 7.88E-04          |
| zinc                           | 4.40E-03           | 5.84E-03           | 6.81E-03           | 3.85E-03          |

| <b>Ubicación<br/>Parámetro</b> | <b>Molejones</b> | <b>Coclesito</b> | <b>Mina Fenceline</b> | <b>Puerto Fenceline</b> |
|--------------------------------|------------------|------------------|-----------------------|-------------------------|
| aluminio                       | 2.32E-02         | 9.06E-02         | 2.63E-02              | 3.00E-02                |
| arsénico                       | 8.52E-04         | 3.32E-03         | 9.64E-04              | 1.10E-03                |
| bario                          | 2.90E-03         | 1.13E-02         | 3.29E-03              | 3.75E-03                |
| cadmio                         | 2.59E-03         | 1.01E-02         | 2.93E-03              | 3.35E-03                |
| cromo                          | 2.32E-04         | 9.07E-04         | 2.63E-04              | 3.00E-04                |
| cobalto                        | 1.16E-03         | 4.53E-03         | 1.31E-03              | 1.50E-03                |
| cobre                          | 2.56E-03         | 9.97E-03         | 2.89E-03              | 3.30E-03                |
| hierro                         | 2.98E-02         | 1.16E-01         | 3.38E-02              | 3.85E-02                |
| plomo                          | 3.90E-03         | 1.52E-02         | 4.41E-03              | 5.03E-03                |
| manganeso                      | 7.74E-05         | 3.02E-04         | 8.76E-05              | 1.00E-04                |
| mercurio                       | 2.71E-03         | 1.06E-02         | 3.07E-03              | 3.50E-03                |
| molibdeno                      | 3.89E-03         | 1.52E-02         | 4.40E-03              | 5.03E-03                |
| níquel                         | 5.71E-03         | 2.23E-02         | 6.46E-03              | 7.38E-03                |
| selenio                        | 2.32E-04         | 9.07E-04         | 2.63E-04              | 3.00E-04                |
| vanadio                        | 6.97E-04         | 2.72E-03         | 7.88E-04              | 9.00E-04                |
| zinc                           | 3.41E-03         | 1.33E-02         | 3.85E-03              | 4.40E-03                |

Tabla 31      Tabla de Análisis de Metales en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Ubicación de la Muestra        | Coclesito      | Molejones      | Río Caimito    | Molejones    | Río Caimito  | Coclesito     | Molejones     | Coclesito     | Molejones     | Río Caimito    | Coclesito      |
|--------------------------------|----------------|----------------|----------------|--------------|--------------|---------------|---------------|---------------|---------------|----------------|----------------|
| Vegetación                     | GUINEO#1 FRUTO | GUINEO#1 FRUTO | GUINEO#1 FRUTO | YUCA#1 FRUTO | YUCA#1 FRUTO | ARROZ#1 GRANO | ARROZ#1 GRANO | ARROZ#1 HOJAS | ARROZ#1 HOJAS | GUINEO#1 HOJAS | GUINEO#1 HOJAS |
| Fecha de la Muestra            | 27-Ago-08      | 28-Ago-08      | 29-Ago-08      | 26-Ago-08    | 29-Ago-08    | 27-Ago-08     | 25-Ago-08     | 27-Ago-08     | 25-Ago-08     | 29-Ago-08      | 27-Ago-08      |
| Identificación del Laboratorio | L685670-1      | L685670-2      | L685670-3      | L685670-7    | L685670-8    | L685670-24    | L685670-25    | L685670-26    | L685670-27    | L685670-31     | L685670-32     |
| Matriz                         | Tejido         | Tejido         | Tejido         | Tejido       | Tejido       | Tejido        | Tejido        | Tejido        | Tejido        | Tejido         | Tejido         |
| <b>Parámetros Físicos</b>      |                |                |                |              |              |               |               |               |               |                |                |
| % de humedad                   | 87.4           | 80.1           | 72.3           | 66.6         | 65.8         | 50.1          | 37.5          | 52.9          | 36.1          | 77.8           | 80.8           |
| <b>Metales</b>                 |                |                |                |              |              |               |               |               |               |                |                |
| aluminio                       | 2.9            | 2.2            | 5.3            | 18.4         | 19.9         | 13.8          | 10.6          | 26.8          | <6.0          | 44.4           | 5              |
| antimonio                      | <0.010         | <0.010         | <0.010         | <0.010       | <0.010       | <0.030        | <0.030        | <0.030        | <0.030        | <0.030         | <0.010         |
| arsénico                       | <0.010         | <0.010         | <0.010         | <0.010       | <0.010       | <0.030        | <0.030        | <0.030        | <0.030        | <0.030         | <0.010         |
| bario                          | 2.54           | 8.36           | 0.269          | 0.891        | 1            | 5.65          | 11.8          | 67.9          | 58.2          | 10.4           | 17.7           |
| berilio                        | <0.10          | <0.10          | <0.10          | <0.10        | <0.10        | <0.30         | <0.30         | <0.30         | <0.30         | <0.30          | <0.10          |
| bismuto                        | <0.030         | <0.030         | <0.030         | <0.030       | <0.030       | <0.090        | <0.090        | <0.090        | <0.090        | <0.090         | <0.030         |
| boro                           | 6              | 7.1            | 5              | 4.8          | 4.8          | 12.2          | 12.2          | 13.7          | 8.4           | 27.6           | 7.8            |
| cadmio                         | <0.0050        | <0.0050        | <0.0050        | <0.0050      | <0.0050      | 0.027         | 0.065         | 0.023         | 0.062         | <0.015         | <0.0050        |
| calcio                         | 413            | 246            | 108            | 221          | 313          | 233           | 338           | 3460          | 1970          | 6,560          | 1,290          |
| cromo                          | <0.10          | <0.10          | <0.10          | <0.10        | <0.10        | 4.23          | 2.4           | 3             | 4.7           | 1.29           | 0.2            |
| cobalto                        | <0.020         | <0.020         | <0.020         | <0.020       | <0.020       | 0.072         | <0.060        | 0.091         | 0.084         | <0.060         | <0.020         |
| cobre                          | 0.404          | 0.469          | 1.34           | 0.949        | 0.988        | 3.08          | 2.99          | 4.88          | 5.87          | 7.07           | 1.34           |
| plomo                          | <0.020         | <0.020         | 0.037          | 0.47         | 0.427        | <0.060        | <0.060        | <0.060        | 0.216         | 0.134          | <0.020         |
| litio                          | <0.10          | <0.10          | <0.10          | <0.10        | <0.10        | <0.30         | <0.30         | <0.30         | <0.30         | <0.30          | <0.10          |
| magnesio                       | 431            | 314            | 208            | 321          | 471          | 534           | 484           | 1290          | 1600          | 2090           | 779            |
| manganeso                      | 12.7           | 39.6           | 2.29           | 3.19         | 4.02         | 150           | 300           | 1590          | 690           | 217            | 125            |
| mercurio                       | <0.0010        | <0.0010        | <0.0010        | <0.0010      | 0.0011       | 0.0039        | 0.004         | 0.0123        | 0.0077        | 0.0178         | 0.0048         |
| molibdeno                      | 0.015          | <0.010         | 0.076          | 0.062        | 0.059        | 0.102         | 0.08          | 0.206         | 0.183         | 0.654          | 0.038          |
| níquel                         | <0.10          | <0.10          | <0.10          | <0.10        | <0.10        | 2.16          | 1.88          | 1.25          | 2.15          | 0.78           | 0.13           |
| selenio                        | 0.048          | <0.020         | <0.020         | <0.020       | 0.037        | 0.096         | 0.088         | 0.212         | 0.243         | 0.109          | <0.020         |
| plata                          | <0.010         | <0.010         | <0.010         | <0.010       | <0.010       | <0.010        | <0.010        | <0.010        | <0.010        | <0.010         | <0.010         |
| estroncio                      | 3.22           | 3.28           | 0.976          | 2.1          | 2.65         | 1.5           | 2.69          | 19.3          | 12.7          | 41.4           | 11.6           |
| talio                          | <0.010         | <0.010         | <0.010         | <0.010       | <0.010       | <0.030        | <0.030        | <0.030        | <0.030        | <0.030         | <0.010         |
| estaño                         | <0.050         | <0.050         | <0.050         | <0.050       | <0.050       | <0.15         | <0.15         | <0.15         | <0.15         | <0.15          | <0.050         |
| uranio                         | <0.0020        | <0.0020        | <0.0020        | <0.0020      | <0.0020      | <0.0060       | <0.0060       | <0.0060       | <0.0060       | <0.0060        | <0.0020        |
| vanadio                        | <0.10          | <0.10          | <0.10          | <0.10        | <0.10        | <0.30         | <0.30         | <0.30         | <0.30         | <0.30          | <0.10          |
| zinc                           | 4.31           | 3.06           | 3.01           | 5.83         | 9.84         | 22.9          | 34.2          | 12.4          | 18.9          | 13.6           | 3.53           |

Tabla 31      Tabla de Análisis de Metales en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Ubicación de la Muestra        | Molejones      | Río Caimito  | Molejones    | 0536584-0976500 | 0536584-0976500 | 0536470-0978834 | 0534485-0976630-(METALES) | 0534485-0976630 | 0536353-0987255 | 0536353-0987255 | 0536353-0987255 |
|--------------------------------|----------------|--------------|--------------|-----------------|-----------------|-----------------|---------------------------|-----------------|-----------------|-----------------|-----------------|
| Vegetación                     | GUINEO#1 HOJAS | YUCA#1 HOJAS | YUCA#1 HOJAS | HOJAS           | FRUTO 1         | HOJAS B         | FRUTO                     | HOJAS 1         | FRUTOS A        | FRUTO B         | HOJAS 1         |
| Fecha de la Muestra            | 28-Ago-08      | 29-Ago-08    | 26-Ago-08    | 4-Oct-08        | 4-Oct-08        | 6-Oct-08        |                           |                 | 5-Oct-08        | 5-Oct-08        | 5-Oct-08        |
| Identificación del Laboratorio | L685670-33     | L685670-37   | L685670-38   | L719088-2       | L719088-6       | L719088-10      | L719088-11                | L719088-13      | L719088-17      | L719088-19      | L719088-22      |
| Matriz                         | Tejido         | Tejido       | Tejido       | Tejido          | Tejido          | Tejido          | Tejido                    | Tejido          | Tejido          | Tejido          | Tejido          |
| <b>Parámetros Físicos</b>      |                |              |              |                 |                 |                 |                           |                 |                 |                 |                 |
| % de humedad                   | 72.1           | 69.7         | 70.4         | 67.6            | 78.2            | 73.4            | 86.2                      | 69.3            | 75.7            | 78.7            | 60.3            |
| <b>Metales</b>                 |                |              |              |                 |                 |                 |                           |                 |                 |                 |                 |
| aluminio                       | 18.6           | 24.7         | 59           | 3250            | 15              | 13              | 132                       | 1670            | 2.3             | 42.2            | 9               |
| antimonio                      | <0.010         | <0.020       | <0.020       | <0.020          | <0.010          | <0.010          | <0.010                    | <0.010          | <0.010          | <0.010          | <0.010          |
| arsénico                       | <0.010         | <0.020       | <0.020       | <0.020          | <0.010          | <0.010          | <0.010                    | <0.010          | <0.010          | <0.010          | <0.010          |
| bario                          | 30.8           | 1.94         | 7.56         | 55.6            | 10.6            | 8.66            | 0.881                     | 2.45            | 0.36            | 8.59            | 0.298           |
| berilio                        | <0.10          | <0.20        | <0.20        | <0.20           | <0.10           | <0.10           | <0.10                     | <0.10           | <0.10           | <0.10           | <0.10           |
| bismuto                        | <0.030         | <0.060       | <0.060       | <0.060          | <0.030          | <0.030          | <0.030                    | <0.030          | <0.030          | <0.030          | <0.030          |
| boro                           | 6.1            | 15.4         | 15.7         | 26.4            | 9.6             | 6.8             | 6.4                       | 11.8            | 3.9             | 7.8             | 12.1            |
| cadmio                         | <0.0050        | <0.010       | <0.010       | 0.135           | <0.0050         | 0.0858          | 0.0367                    | 0.0343          | <0.0050         | 0.0092          | <0.0050         |
| calcio                         | 1,720          | 2,780        | 3,220        | 3,060           | 2,680           | 5,400           | 375                       | 874             | 382             | 795             | 257             |
| cromo                          | 0.27           | <0.20        | <0.20        | 0.38            | <0.10           | 0.58            | <0.10                     | 0.19            | <0.10           | <0.10           | 2.68            |
| cobalto                        | <0.020         | <0.040       | 0.15         | 0.522           | 0.081           | <0.020          | <0.020                    | <0.020          | <0.020          | 0.046           | 0.028           |
| cobre                          | 0.893          | 2.5          | 2.44         | 1.81            | 1.54            | 2.53            | 1.58                      | 2.73            | 4               | 3.26            | 3.28            |
| plomo                          | 0.021          | 0.421        | 0.081        | 0.111           | 0.039           | <0.020          | <0.020                    | <0.020          | <0.020          | 0.03            | <0.020          |
| litio                          | <0.10          | <0.20        | <0.20        | <0.20           | <0.10           | <0.10           | <0.10                     | <0.10           | <0.10           | <0.10           | <0.10           |
| magnesio                       | 625            | 1140         | 958          | 2310            | 744             | 778             | 683                       | 1560            | 443             | 608             | 298             |
| manganeso                      | 400            | 77.5         | 220          | 973             | 194             | 29.4            | 3.93                      | 10.7            | 26.5            | 5.7             | 26.1            |
| mercurio                       | 0.0053         | 0.0076       | 0.0122       | 0.0512          | 0.0012          | 0.0297          | <0.0010                   | 0.0329          | <0.0010         | <0.0010         | 0.022           |
| molibdeno                      | 0.019          | 0.393        | <0.020       | <0.020          | <0.010          | 0.032           | 0.052                     | 0.033           | <0.010          | 0.108           | 0.055           |
| níquel                         | 0.22           | 0.27         | 0.27         | 0.68            | <0.10           | 0.46            | 0.29                      | 0.59            | 0.11            | 0.25            | 1.08            |
| selenio                        | 0.051          | 0.021        | 0.044        | 0.19            | 0.048           | 0.102           | 0.04                      | 0.051           | 0.212           | 0.031           | 0.469           |
| plata                          | <0.010         | <0.010       | <0.010       | <0.020          | <0.010          | <0.010          | <0.010                    | <0.010          | <0.010          | <0.010          | <0.010          |
| estroncio                      | 15.2           | 11.6         | 19.1         | 86              | 26              | 38              | 7.11                      | 18              | 2.04            | 10.1            | 1.24            |
| talio                          | <0.010         | <0.020       | <0.020       | <0.020          | <0.010          | <0.010          | <0.010                    | <0.010          | <0.010          | <0.010          | <0.010          |
| estaño                         | <0.050         | <0.10        | <0.10        | <0.10           | <0.050          | <0.050          | <0.050                    | <0.050          | <0.050          | <0.050          | <0.050          |
| uranio                         | <0.0020        | <0.0040      | <0.0040      | <0.0040         | <0.0020         | <0.0020         | <0.0020                   | <0.0020         | <0.0020         | <0.0020         | <0.0020         |
| vanadio                        | <0.10          | <0.20        | <0.20        | <0.20           | <0.10           | <0.10           | <0.10                     | <0.10           | <0.10           | <0.10           | <0.10           |
| zinc                           | 2.94           | 50.4         | 35.2         | 33.4            | 1.5             | 5.94            | 3.85                      | 3.91            | 6.24            | 7.77            | 5.08            |

Tabla 31      Tabla de Análisis de Metales en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Ubicación de la Muestra        | 0536353-0987255 | 0539137-0978302 | 0539137-0978302 | 0539137-0978302 | 0539137-0978302 | 0536450-09878838 | 0536450-09878838 | 0536450-09878838 | 0529754-0981600 | 0529754-0981600 |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|-----------------|-----------------|
| Vegetación                     | HOJAS B         | FRUTO           | FRUTO 1         | HOJAS 1         | HOJAS           | FRUTO A          | FRUTO B          | HOJA A           | FRUTO 1         | HOJAS 1         |
| Fecha de la Muestra            |                 | 4-Oct-08        | 4-Oct-08        | 4-Oct-08        | 4-Oct-08        | 6-Oct-08         | 6-Oct-08         | 6-Oct-08         | 7-Oct-08        | 7-Oct-08        |
| Identificación del Laboratorio | L719088-25      | L719088-26      | L719088-28      | L719088-32      | L719088-35      | L719088-36       | L719088-38       | L719088-40       | L719088-43      | L719088-47      |
| Matriz                         | Tejido          | Tejido          | Tejido          | Tejido          | Tejido          | Tejido           | Tejido           | Tejido           | Tejido          | Tejido          |
| <b>Parámetros Físicos</b>      |                 |                 |                 |                 |                 |                  |                  |                  |                 |                 |
| % de humedad                   | 79.4            | 77.3            | 76.5            | 71.2            | 66.7            | 85.5             | 64.1             | 76.2             | 75.8            | 78.3            |
| <b>Metales</b>                 |                 |                 |                 |                 |                 |                  |                  |                  |                 |                 |
| aluminio                       | 51.9            | <2.0            | 2480            | 3050            | 32.7            | 3.8              | <2.0             | 27               | 3.6             | 13.7            |
| antimonio                      | <0.010          | <0.010          | <0.020          | <0.020          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010          | <0.010          |
| arsénico                       | <0.010          | <0.010          | <0.020          | <0.020          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010          | <0.010          |
| bario                          | 7.82            | 2.49            | 5.92            | 7.79            | 13.9            | 4.62             | 1.51             | 50.3             | 5.25            | 10.2            |
| berilio                        | <0.10           | <0.10           | <0.20           | <0.20           | <0.10           | <0.10            | <0.10            | <0.10            | <0.10           | <0.10           |
| bismuto                        | <0.030          | <0.030          | <0.060          | <0.060          | <0.030          | <0.030           | <0.030           | <0.030           | <0.030          | <0.030          |
| boro                           | 11.5            | 14.6            | 19.3            | 40.5            | 42.4            | 5.2              | 5.5              | 14.3             | 5               | 7.3             |
| cadmio                         | 0.0111          | <0.0050         | 0.029           | 0.021           | 0.0056          | <0.0050          | 0.0275           | 0.0368           | 0.0069          | 0.0171          |
| calcio                         | 802             | 466             | 2,390           | 3,470           | 2,480           | 462              | 1,330            | 6,690            | 1,030           | 1,390           |
| cromo                          | 0.16            | <0.10           | 2.3             | 3.17            | 0.29            | 0.22             | <0.10            | 0.15             | 0.18            | <0.10           |
| cobalto                        | 0.025           | <0.020          | 0.072           | 0.162           | <0.020          | <0.020           | <0.020           | <0.020           | 0.054           | 0.071           |
| cobre                          | 2.81            | 5.4             | 1.84            | 1.76            | 5.61            | 4.08             | 3.79             | 2.46             | 3.3             | 6.17            |
| plomo                          | 0.109           | <0.020          | <0.040          | 0.062           | 0.147           | <0.020           | <0.020           | 0.064            | <0.020          | <0.020          |
| litio                          | <0.10           | <0.10           | <0.20           | <0.20           | <0.10           | <0.10            | <0.10            | <0.10            | <0.10           | 0.28            |
| magnesio                       | 381             | 589             | 1270            | 1730            | 1920            | 203              | 460              | 1320             | 616             | 841             |
| manganeso                      | 6.51            | 7.18            | 24.3            | 72.3            | 22.5            | 2.37             | 6.97             | 22.7             | 82.9            | 114             |
| mercurio                       | 0.0115          | 0.0065          | 0.0025          | 0.0203          | 0.0244          | 0.0041           | 0.0017           | 0.0118           | <0.0010         | 0.0047          |
| molibdeno                      | 0.054           | 0.015           | <0.020          | <0.020          | 0.025           | 0.247            | 0.266            | 0.18             | 0.329           | 0.345           |
| níquel                         | 0.12            | 1.69            | 0.47            | 0.55            | 8.7             | 0.28             | 0.22             | 0.27             | 0.12            | <0.10           |
| selenio                        | 0.032           | 0.036           | 0.087           | 0.097           | 0.121           | 0.044            | 0.06             | 0.065            | 0.071           | 0.025           |
| plata                          | <0.010          | <0.010          | <0.020          | <0.020          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010          | <0.010          |
| estroncio                      | 9.81            | 3.24            | 28.5            | 37.9            | 20.7            | 4.35             | 11.7             | 52.8             | 6.61            | 8.89            |
| talio                          | <0.010          | 0.026           | <0.020          | <0.020          | 0.131           | <0.010           | <0.010           | <0.010           | <0.010          | <0.010          |
| estaño                         | <0.050          | <0.050          | <0.10           | <0.10           | 0.295           | <0.050           | <0.050           | <0.050           | <0.050          | <0.050          |
| uranio                         | <0.0020         | <0.0020         | <0.0040         | <0.0040         | 0.0021          | <0.0020          | <0.0020          | <0.0020          | <0.0020         | <0.0020         |
| vanadio                        | <0.10           | <0.10           | <0.20           | <0.20           | <0.10           | <0.10            | <0.10            | <0.10            | <0.10           | <0.10           |
| zinc                           | 8.5             | 3.1             | 9.92            | 11.5            | 4.46            | 2.33             | 4.9              | 8.72             | 6.05            | 14.8            |

Tabla 31      Tabla de Análisis de Metales en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología (continuación)

| Ubicación de la Muestra        | 0538538-0980036 | 0538538-0980036 | 0536226-0982152 | 0536226-0982152 | 0536226-0982152 | 0536226-0982152 | 0538340-0981770 | 0538340-0981770 | 0533588-09996774 | 0533588-09996774 |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|
| Vegetación                     | FRUTO           | HOJAS 1         | FRUTO           | FRUTO A         | HOJAS A         | HOJA B          | FRUTO 1         | HOJAS 1         | FRUTO 1          | HOJAS 1          |
| Fecha de la Muestra            | 4-Oct-08        | 4-Oct-08        | 5-Oct-08        | 5-Oct-08        | 5-Oct-08        | 5-Oct-08        | 6-Oct-08        | 6-Oct-08        | 5-Oct-08         | 5-Oct-08         |
| Identificación del Laboratorio | L719088-52      | L719088-56      | L719088-60      | L719088-61      | L719088-63      | L719088-65      | L719088-68      | L719088-72      | L719088-76       | L719088-80       |
| Matriz                         | Tejido          | Tejido          | Tejido          | Tejido          | Tejido          | Tejido          | Tejido          | Tejido          | Tejido           | Tejido           |
| <b>Parámetros Físicos</b>      |                 |                 |                 |                 |                 |                 |                 |                 |                  |                  |
| % de humedad                   | 52.5            | 57.2            | 76.1            | 88.9            | 84.1            | 71.1            | 85.4            | 78.8            | 77.7             | 71.8             |
| <b>Metales</b>                 |                 |                 |                 |                 |                 |                 |                 |                 |                  |                  |
| aluminio                       | 6.8             | 13.9            | 2.5             | <2.0            | 2.2             | 8.1             | 3520            | 5010            | 1060             | 3540             |
| antimonio                      | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.020          | <0.040          | <0.010           | <0.020           |
| arsénico                       | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.020          | <0.040          | <0.010           | <0.020           |
| bario                          | 2.73            | 8.6             | 2.69            | 12.8            | 2.77            | 8.96            | 34              | 33.4            | 1.03             | 1.56             |
| berilio                        | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.20           | <0.40           | <0.10            | <0.20            |
| bismuto                        | <0.030          | <0.030          | <0.030          | <0.030          | <0.030          | <0.030          | <0.060          | <0.12           | <0.030           | <0.060           |
| boro                           | 6.7             | 11.1            | 10.7            | 6               | 4               | 12.4            | 6.3             | 10.9            | 7.3              | 16.2             |
| cadmio                         | 0.0095          | 0.0207          | 0.0144          | 0.0205          | 0.0051          | 0.0538          | 0.024           | <0.020          | 0.0054           | <0.010           |
| calcio                         | 402             | 2,020           | 870             | 739             | 471             | 2,390           | 1,190           | 1,930           | 2,830            | 2,950            |
| cromo                          | 0.12            | 1.32            | <0.10           | <0.10           | 0.27            | 0.12            | <0.20           | <0.40           | <0.10            | <0.20            |
| cobalto                        | <0.020          | <0.020          | 0.158           | 0.02            | <0.020          | 0.039           | <0.040          | <0.080          | <0.020           | <0.040           |
| cobre                          | 4.44            | 2.24            | 3.93            | 2.21            | 2.93            | 3.76            | 1.23            | 1.09            | 2.81             | 1.38             |
| plomo                          | <0.020          | 0.026           | <0.020          | <0.020          | <0.020          | 0.024           | <0.040          | <0.080          | <0.020           | 0.045            |
| litio                          | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.20           | <0.40           | <0.10            | <0.20            |
| magnesio                       | 581             | 928             | 379             | 368             | 369             | 645             | 3020            | 3100            | 990              | 1250             |
| manganeso                      | 7.6             | 19.2            | 4.42            | 186             | 58.8            | 21.2            | 85.9            | 75              | 9.53             | 15.6             |
| mercurio                       | <0.0010         | 0.0249          | <0.0010         | <0.0010         | 0.0064          | 0.0215          | 0.0049          | 0.0172          | 0.0028           | 0.0308           |
| molibdeno                      | 0.88            | 1.73            | 0.027           | 0.011           | 0.015           | 0.015           | <0.020          | <0.040          | 0.328            | 0.111            |
| níquel                         | <0.10           | 0.56            | <0.10           | 0.1             | 0.25            | <0.10           | 0.49            | 1.06            | 0.26             | <0.20            |
| selenio                        | 0.068           | 0.3             | 0.041           | 0.029           | 0.044           | 0.041           | <0.020          | 0.044           | 0.06             | 0.045            |
| plata                          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.020          | <0.040          | <0.010           | <0.020           |
| estroncio                      | 6.45            | 24.1            | 1.7             | 9.48            | 5.58            | 7.23            | 56.6            | 62.7            | 28.6             | 34.2             |
| talio                          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.010          | <0.020          | <0.040          | <0.010           | <0.020           |
| estaño                         | <0.050          | <0.050          | <0.050          | <0.050          | <0.050          | <0.050          | <0.10           | <0.20           | <0.050           | <0.10            |
| uranio                         | <0.0020         | <0.0020         | <0.0020         | <0.0020         | <0.0020         | <0.0020         | <0.0040         | <0.0080         | <0.0020          | <0.0040          |
| vanadio                        | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.10           | <0.20           | <0.40           | <0.10            | <0.20            |
| zinc                           | 12.5            | 7.3             | 8.36            | 8.81            | 3.51            | 4.56            | 5.58            | 4.46            | 9.07             | 12.1             |

Notas: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

Tabla 32      Tabla de Análisis de Hidrocarburos Aromáticos Policíclicos en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Ubicación de la Muestra               | Río Caimito     | Río Caimito     | Coclesito        | Molejones        | Coclesito        | Molejones        | Molejones                | Molejones       | 0534485-0976630- | 0534485-0976630- | 0539137-0978302- | 0539137-0978302- |
|---------------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|--------------------------|-----------------|------------------|------------------|------------------|------------------|
| Vegetación                            | YUCA#1<br>HOJAS | YUCA#1<br>FRUTO | ARROZ#1<br>HOJAS | ARROZ#1<br>HOJAS | ARROZ#1<br>GRANO | ARROZ#1<br>GRANO | YUCA#1<br>RAIZ<br>RAÍCES | YUCA#1<br>HOJAS | FRUTO            | HOJAS            | FRUTO 1          | HOJAS 1          |
| Fecha de la Muestra                   | 29-Ago-08       | 29-Ago-08       | 27-Ago-08        | 25-Ago-08        | 27-Ago-08        | 25-Ago-08        | 26-Ago-08                | 26-Ago-08       |                  |                  | 4-Oct-08         | 4-Oct-08         |
| Identificación del Laboratorio        | L685670-41      | L685670-42      | L685670-55       | L685670-56       | L685670-57       | L685670-58       | L685670-72               | L685670-73      | L719088-12       | L719088-15       | L719088-27       | L719088-31       |
| Matriz                                | Tejido          | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           | Tejido                   | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           |
| Hidrocarburos Aromáticos Policíclicos |                 |                 |                  |                  |                  |                  |                          |                 |                  |                  |                  |                  |
| acenafteno                            | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.060           | <0.020           |
| acenaftileno                          | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| antraceno                             | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.030          | <0.010           | <0.020           | <0.010           | <0.020           |
| benzo(a)antraceno                     | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| benzo(a)pireno                        | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| benzo(b)fluoranteno                   | <0.020          | <0.010          | <0.030           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| benzo(g,h,i)perileno                  | <0.080          | <0.020          | <0.020           | <0.020           | <0.020           | <0.030           | <0.030                   | <0.070          | <0.010           | <0.020           | <0.010           | <0.020           |
| benzo(k)fluoranteno                   | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| criseno                               | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| dibenzo(a,h)antraceno                 | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| fluoranteno                           | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| fluoreno                              | <0.080          | <0.010          | <0.060           | <0.060           | <0.020           | <0.030           | <0.010                   | 0.062           | <0.010           | <0.090           | <0.010           | <0.040           |
| indeno(1,2,3-c,d)pireno               | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| naftaleno                             | 0.038           | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| fenantreno                            | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |
| pireno                                | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.010           | <0.020           | <0.010           | <0.020           |

Notas! Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

Tabla 33      Tabla de Análisis de Bifenilos Policlorados en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Ubicación de la Muestra        | Rio Caimito     | Rio Caimito     | Coclesito        | Molejones        | Coclesito        | Molejones        | Molejones                | Molejones       | 0534485-0976630- | 0534485-0976630- | 0539137-0978302- | 0539137-0978302- |
|--------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|--------------------------|-----------------|------------------|------------------|------------------|------------------|
| Vegetación                     | YUCA#1<br>HOJAS | YUCA#1<br>FRUTO | ARROZ#1<br>HOJAS | ARROZ#1<br>HOJAS | ARROZ#1<br>GRANO | ARROZ#1<br>GRANO | YUCA#1<br>RAIZ<br>RAÍCES | YUCA#1<br>HOJAS | FRUTO            | HOJAS            | FRUTO 1          | HOJAS 1          |
| Fecha de la Muestra            | 29-Ago-08       | 29-Ago-08       | 27-Ago-08        | 25-Ago-08        | 27-Ago-08        | 25-Ago-08        | 26-Ago-08                | 26-Ago-08       |                  |                  | 4-Oct-08         | 4-Oct-08         |
| Identificación del Laboratorio | L685670-41      | L685670-42      | L685670-55       | L685670-56       | L685670-57       | L685670-58       | L685670-72               | L685670-73      | L719088-12       | L719088-15       | L719088-27       | L719088-31       |
| Matriz                         | Tejido          | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           | Tejido                   | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           |
| Bifenilos Policlorados         |                 |                 |                  |                  |                  |                  |                          |                 |                  |                  |                  |                  |
| PCB-1016                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1221                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1232                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1242                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1248                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1254                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1260                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1262                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| PCB-1268                       | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |
| Total PCB                      | <0.050          | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           | <0.050                   | <0.050          | <0.050           | <0.050           | <0.050           | <0.050           |

Notas: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.



Tabla 34      Tabla de Análisis de Pesticidas Organoclorados en Tejidos Vegetales de Línea Base para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Ubicación de la Muestra        | Río Caimito     | Río Caimito     | Coclesito        | Molejones        | Coclesito        | Molejones        | Molejones                | Molejones       | 0534485-0976630- | 0534485-0976630- | 0539137-0978302- | 0539137-0978302- |
|--------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|--------------------------|-----------------|------------------|------------------|------------------|------------------|
| Vegetación                     | YUCA#1<br>HOJAS | YUCA#1<br>FRUTO | ARROZ#1<br>HOJAS | ARROZ#1<br>HOJAS | ARROZ#1<br>GRANO | ARROZ#1<br>GRANO | YUCA#1<br>RAIZ<br>RAÍCES | YUCA#1<br>HOJAS | FRUTO            | HOJAS            | FRUTO 1          | HOJAS 1          |
| Fecha de la Muestra            | 29-Ago-08       | 29-Ago-08       | 27-Ago-08        | 25-Ago-08        | 27-Ago-08        | 25-Ago-08        | 26-Ago-08                | 26-Ago-08       |                  |                  | 4-Oct-08         | 4-Oct-08         |
| Identificación del Laboratorio | L685670-41      | L685670-42      | L685670-55       | L685670-56       | L685670-57       | L685670-58       | L685670-72               | L685670-73      | L719088-12       | L719088-15       | L719088-27       | L719088-31       |
| Matriz                         | Tejido          | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           | Tejido                   | Tejido          | Tejido           | Tejido           | Tejido           | Tejido           |
| Pesticidas Organoclorados      |                 |                 |                  |                  |                  |                  |                          |                 |                  |                  |                  |                  |
| aldrín                         | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| alfa-BHC                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| beta-BHC                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| lindano (gama-BHC)             | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| delta-BHC                      | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| cisclordano (alfa)             | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| transclordano (gama)           | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 2,4'-DDD                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 4,4'-DDD                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 2,4'-DDE                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 4,4'-DDE                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 2,4'-DDT                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| 4,4'-DDT                       | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| dieldrín                       | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.020           |
| endosulfán i                   | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.020           |
| endosulfán ii                  | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.020           |
| endosulfán sulfato             | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.020           |
| endrina                        | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.020           |
| heptacloro                     | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| epóxido de heptacloro          | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| metoxicloro                    | <0.020          | <0.010          | <0.020           | <0.020           | <0.020           | <0.030           | <0.010                   | <0.020          | <0.020           | <0.020           | <0.020           | <0.20            |
| mirex                          | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| cisnonacloro                   | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| transnonacloro                 | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |
| oxiclordano                    | <0.010          | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           | <0.010                   | <0.010          | <0.010           | <0.010           | <0.010           | <0.010           |

Notas; Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

Tabla 35      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en el Aire para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Concentración Promedio Anual | Carcinógeno | Umbral Crónico <sup>m</sup> | Río Caimito | Palmilla | Nueva Lucha | Parralito | Nuevo Sinai | San Benito | Molejones | Coclesito | Fenceline | Máximo   | Línea Base Máxima | Línea Base Máxima +10% | ¿Considerar Como COPC? |
|------------------------------|-------------|-----------------------------|-------------|----------|-------------|-----------|-------------|------------|-----------|-----------|-----------|----------|-------------------|------------------------|------------------------|
| Metales                      |             |                             |             |          |             |           |             |            |           |           |           |          |                   |                        |                        |
| aluminio                     | nc          | 1.04                        | 0.030739    | 0.030290 | 0.041063    | 0.031845  | 0.051544    | 0.178078   | 0.044953  | 0.115391  | 1.103419  | 1.103419 | 0.090588          | 0.099647               | Sí                     |
| antimonio                    | nc          | 0.5                         | 0.013401    | 0.013400 | 0.017788    | 0.013400  | 0.020753    | 0.011741   | 0.010377  | 0.040497  | 0.013433  | 0.040497 | 0.040496          | 0.044546               | No                     |
| arsénico                     | c           | 0.0066                      | 0.001183    | 0.001102 | 0.001466    | 0.001109  | 0.001728    | 0.000995   | 0.000865  | 0.003334  | 0.002194  | 0.003334 | 0.003324          | 0.003657               | No                     |
| bario                        | nc          | 0.104                       | 0.003752    | 0.003751 | 0.004982    | 0.003756  | 0.005824    | 0.003770   | 0.002973  | 0.011412  | 0.006728  | 0.011412 | 0.011333          | 0.012466               | No                     |
| cadmio                       | c           | 0.003                       | 0.003467    | 0.003352 | 0.004455    | 0.003363  | 0.005228    | 0.003360   | 0.002705  | 0.010205  | 0.005550  | 0.010205 | 0.010124          | 0.011137               | No                     |
| cromo (total)                | nc          | 0.1                         | 0.001508    | 0.000310 | 0.000428    | 0.000341  | 0.000673    | 0.001078   | 0.000384  | 0.001078  | 0.016637  | 0.016637 | 0.000907          | 0.000997               | No                     |
| cromo_VI                     | c           | 0.0003                      | 0.000006    | 0.000000 | 0.000001    | 0.000002  | 0.000003    | 0.000002   | 0.000002  | 0.000001  | 0.000144  | 0.000144 | -                 | -                      | No                     |
| cobalto                      | c           | 0.0027                      | 0.001512    | 0.001501 | 0.001994    | 0.001505  | 0.002335    | 0.001488   | 0.001197  | 0.004564  | 0.002496  | 0.004564 | 0.004533          | 0.004987               | No                     |
| cobre                        | nc          | 100                         | 0.731293    | 0.009429 | 0.020151    | 0.022669  | 0.119410    | 0.065369   | 0.028957  | 0.046500  | 6.662378  | 6.662378 | 0.009973          | 0.010970               | No                     |
| hierro                       | nc          | 1                           | 0.040064    | 0.039177 | 0.053772    | 0.042392  | 0.070261    | 0.348465   | 0.074808  | 0.167824  | 2.267020  | 2.267020 | 0.116427          | 0.128070               | Sí                     |
| plomo                        | nc          | 0.5                         | 0.005896    | 0.005041 | 0.006703    | 0.005062  | 0.007938    | 0.004601   | 0.003960  | 0.015274  | 0.016621  | 0.016621 | 0.015211          | 0.016732               | No                     |
| manganeso                    | nc          | 0.15                        | 0.000165    | 0.000114 | 0.000184    | 0.000176  | 0.000357    | 0.005487   | 0.000867  | 0.001189  | 0.038291  | 0.038291 | 0.000302          | 0.000332               | No                     |
| mercurio                     | nc          | 1                           | 0.003510    | 0.003500 | 0.004647    | 0.003502  | 0.005425    | 0.003127   | 0.002713  | 0.010584  | 0.003617  | 0.010584 | 0.010577          | 0.011635               | No                     |
| molibdeno                    | nc          | 5                           | 0.005026    | 0.005025 | 0.006672    | 0.005027  | 0.007788    | 0.004575   | 0.003916  | 0.015214  | 0.005625  | 0.015214 | 0.015186          | 0.016705               | No                     |
| níquel                       | c           | 0.025                       | 0.007398    | 0.007377 | 0.009794    | 0.007381  | 0.011436    | 0.006594   | 0.005729  | 0.022308  | 0.007087  | 0.022308 | 0.022288          | 0.024517               | No                     |
| selenio                      | nc          | 4.2                         | 0.000415    | 0.000307 | 0.000415    | 0.000326  | 0.000520    | 0.000310   | 0.000268  | 0.000925  | 0.002793  | 0.002793 | 0.000907          | 0.000997               | No                     |
| plata                        | nc          | 0.01                        | 0.004804    | 0.004800 | 0.006373    | 0.004802  | 0.007438    | 0.004275   | 0.003735  | 0.014519  | 0.004667  | 0.014519 | 0.014506          | 0.015957               | No                     |
| estroncio                    | nc          | 2                           | 0.006778    | 0.006776 | 0.008999    | 0.006783  | 0.010515    | 0.006599   | 0.005341  | 0.020583  | 0.010641  | 0.020583 | 0.020475          | 0.022522               | No                     |
| talio                        | nc          | 0.1                         | 0.000000    | 0.000000 | 0.000000    | 0.000000  | 0.000000    | 0.000000   | 0.000000  | 0.000000  | 0.000003  | 0.000003 | -                 | -                      | No                     |
| titanio                      | nc          | 5                           | 0.002749    | 0.002735 | 0.003658    | 0.002785  | 0.004385    | 0.007276   | 0.002808  | 0.009034  | 0.037082  | 0.037082 | 0.008235          | 0.009059               | No                     |
| uranio                       | nc          | 0.062                       | 0.000000    | 0.000000 | 0.000000    | 0.000000  | 0.000000    | 0.000003   | 0.000000  | 0.000001  | 0.000025  | 0.000025 | -                 | -                      | No                     |
| vanadio                      | nc          | 0.05                        | 0.004313    | 0.000925 | 0.001268    | 0.000997  | 0.001933    | 0.001675   | 0.000911  | 0.002976  | 0.047201  | 0.047201 | 0.002720          | 0.002992               | No                     |
| zinc                         | nc          | 5                           | 0.004433    | 0.004403 | 0.005854    | 0.004420  | 0.006867    | 0.005026   | 0.003633  | 0.013500  | 0.011954  | 0.013500 | 0.013297          | 0.014627               | No                     |

Nota: Las concentraciones están en µg/m<sup>3</sup>, lo sombreado indica cuando el dato excede el umbral crónico.

Tabla 36      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en los Peces de Agua Dulce para la Evaluación de Riesgos a la Salud Humana y a la Ecología

| Parámetro Regulado | Pez de Agua Dulce en Línea Base | Niveles para Peces RBS Región 3 del APAEU <sup>(a)</sup> | Notas | Cuenca Petaquilla |       |       |       | Cuenca Botija |       |       |       |       | Cuenca Caimito |        |        |        |       |       | ¿Conside rar como COPC? |
|--------------------|---------------------------------|----------------------------------------------------------|-------|-------------------|-------|-------|-------|---------------|-------|-------|-------|-------|----------------|--------|--------|--------|-------|-------|-------------------------|
|                    | Concentraciones Máximas         |                                                          |       | W2                | W2-2  | W10-2 | W10   | W5            | W5-2  | W7-2  | W7    | W16   | W3-2           | W3     | HW8    | W13    | W20   | HW7   |                         |
| aluminio           | 1390                            | 270                                                      |       | 1,390             | 1,390 | 1,390 | 1,390 | 1,390         | 1,390 | 1,390 | 1,390 | 1,390 | 2,085          | 2,085  | 2,085  | 1,390  | 1,390 | 1,390 | Sí                      |
| antimonio          | 0.03                            | 0.108                                                    | m     | 0.03              | 0.03  | 0.03  | 0.03  | 0.03          | 0.03  | 0.0   | 0.03  | 0.03  | 0.03           | 0.03   | 0.03   | 0.03   | 0.03  | 0.03  | No                      |
| arsénico           | 2.29                            | 0.021                                                    |       | 7.63              | 7.63  | 11.5  | 10.3  | 22.9          | 22.9  | 4.6   | 4.58  | 2.67  | 22.9           | 22.9   | 22.9   | 10.305 | 9.16  | 3.435 | Sí                      |
| bario              | 71.5                            | 54                                                       |       | 143               | 143   | 143   | 143   | 214.5         | 214.5 | 71.5  | 71.5  | 71.5  | 113            | 107    | 107    | 72     | 71.5  | 71.5  | Sí                      |
| berilio            | 0.3                             | 0.54                                                     |       | 0.30              | 0.30  | 0.30  | 0.30  | 0.30          | 0.30  | 0.3   | 0.30  | 0.30  | 0.30           | 0.30   | 0.30   | 0.30   | 0.30  | 0.30  | No                      |
| boro               | 11.3                            | 54                                                       |       | 11.3              | 11.3  | 11.3  | 11.3  | 11.3          | 11.3  | 11.3  | 11.3  | 11.3  | 10.17          | 10.17  | 11.3   | 11.3   | 11.3  | 11.3  | No                      |
| cadmio             | 0.24                            | 0.27                                                     | d     | 0.24              | 0.24  | 0.24  | 0.24  | 0.24          | 0.24  | 0.24  | 0.24  | 0.24  | 1.2            | 1.2    | 1.2    | 0.54   | 0.54  | 0.3   | Sí                      |
| cromo              | 19.3                            | 0.812                                                    | p     | 19.3              | 19.3  | 19.3  | 19.3  | 19.3          | 19.3  | 19.3  | 19.3  | 19.3  | 45.0           | 45.0   | 38.6   | 24.1   | 19.3  | 19.3  | Sí                      |
| cobalto            | 0.779                           | 0.0812                                                   |       | 1.04              | 1.04  | 0.779 | 0.779 | 1.04          | 1.04  | 0.8   | 0.779 | 0.779 | 13.0           | 13.0   | 10.4   | 3.9    | 2.6   | 1.6   | Sí                      |
| cobre              | 39.8                            | 10.82                                                    |       | 39.8              | 39.8  | 39.8  | 39.8  | 39.8          | 39.8  | 39.8  | 39.8  | 39.8  | 133            | 133    | 133    | 79.6   | 79.6  | 59.7  | Sí                      |
| plomo              | 2.26                            | NG                                                       |       | 2.26              | 2.26  | 1.695 | 1.695 | 2.26          | 2.26  | 1.81  | 1.81  | 2.26  | 3.77           | 3.77   | 3.77   | 3.39   | 3.39  | 2.26  | Sí                      |
| manganeso          | 102                             | 37.8                                                     | d     | 153               | 153   | 153   | 102   | 204           | 153   | 102   | 102   | 102   | 408            | 408    | 306    | 204    | 102   | 113   | Sí                      |
| mercurio           | 0.137                           | 0.027                                                    | h     | 0.137             | 0.137 | 0.137 | 0.137 | 0.137         | 0.137 | 0.137 | 0.137 | 0.137 | 0.0617         | 0.0685 | 0.0685 | 0.137  | 0.137 | 0.137 | No                      |
| molibdeno          | 1.84                            | 1.352                                                    |       | 55.2              | 55.2  | 46    | 46    | 30.7          | 27.6  | 9.2   | 9.2   | 3.07  | 46             | 46     | 46     | 46     | 36.8  | 4.14  | Sí                      |
| níquel             | 10.9                            | 5.4                                                      | s     | 10.9              | 10.9  | 10.9  | 10.9  | 10.9          | 10.9  | 10.9  | 10.9  | 10.9  | 72.7           | 72.7   | 72.7   | 38.2   | 32.7  | 16.4  | Sí                      |
| selenio            | 0.827                           | 1.352                                                    |       | 0.827             | 0.827 | 1.24  | 1.24  | 1.03          | 1.03  | 0.827 | 0.827 | 0.827 | 3.31           | 3.31   | 2.89   | 1.03   | 1.24  | 0.83  | Sí                      |
| plata              | 0.02                            | 1.35                                                     |       | 0.02              | 0.02  | 0.02  | 0.02  | 0.02          | 0.02  | 0.02  | 0.02  | 0.02  | 0.04           | 0.04   | 0.04   | 0.028  | 0.028 | 0.02  | No                      |
| uranio             | 0.137                           | 0.812                                                    | s     | 0.137             | 0.137 | 0.137 | 0.137 | 0.137         | 0.137 | 0.137 | 0.137 | 0.137 | 0.137          | 0.137  | 0.137  | 0.137  | 0.137 | 0.137 | No                      |
| vanadio            | 3.9                             | 1.362                                                    |       | 3.9               | 3.9   | 3.9   | 3.9   | 3.9           | 3.9   | 3.9   | 3.9   | 3.9   | 3.12           | 3.12   | 3.51   | 3.9    | 3.9   | 3.9   | No                      |
| zinc               | 42.8                            | 81.2                                                     | m     | 42.8              | 42.8  | 42.8  | 42.8  | 85.6          | 64.2  | 42.8  | 42.8  | 42.8  | 428            | 428    | 428    | 149.8  | 149.8 | 85.6  | Sí                      |

(a) Niveles de análisis para peces en base al riesgo para peces en la región 3 de la APAEU (Mayo 2008); Normas específicas del sitio: m = metálico; d = dieta; p = partículas de cromo VI; i = sales inorgánicas; s = sales solubles; h = metilmercurio.

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima.

|     |                                                |
|-----|------------------------------------------------|
| 0.3 | Excede la norma para tejido muscular de peces. |
| 0.3 | Coefficiente de aumento > 1.1.                 |

Tabla 37      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en el Suelo para la Evaluación de Riesgos a la Salud Humana

| Parámetros     | Lineamientos de Salud Humana del CCME <sup>(a,b,c)</sup> para AL | Notas | Lineamientos de Salud Humana del CCME <sup>(a,b,c)</sup> para RL | Notas          | Normas Panameñas de Suelos Uso Urbano | Normas Panameñas de Suelos Otros Usos | Lineamiento/ Norma Mínima de Salud Humana | Concentración de Impacto Máxima Prevista | ¿Excede el Criterio de Análisis Mínimo? | Línea Base (Tendencia Central) | Línea Base + 10% | (Tendencia Central) Máxima Prevista | ¿>10% de Incremento ? | ¿Considerar Como COPC? <sup>(d)</sup> |
|----------------|------------------------------------------------------------------|-------|------------------------------------------------------------------|----------------|---------------------------------------|---------------------------------------|-------------------------------------------|------------------------------------------|-----------------------------------------|--------------------------------|------------------|-------------------------------------|-----------------------|---------------------------------------|
| <b>Metales</b> |                                                                  |       |                                                                  |                |                                       |                                       |                                           |                                          |                                         |                                |                  |                                     |                       |                                       |
| aluminio       | ND                                                               |       | ND                                                               |                | ND                                    | ND                                    | ND                                        | 61,180                                   | ND                                      | 31476                          | 34624            | 32056                               | No                    | No                                    |
| antimonio      | 20                                                               | n     | 20                                                               | n              | ND                                    | ND                                    | 20                                        | 10.5                                     | No                                      | 10.0                           | 11               | 10.5                                | No                    | No                                    |
| arsénico       | 12                                                               | i     | 12                                                               | i              | 20                                    | 4                                     | 4                                         | 18.6                                     | Sí                                      | 5.00                           | 6                | 18.3                                | Sí                    | Sí                                    |
| bario          | 750                                                              | n     | 500                                                              | n              | 100                                   | 10                                    | 10                                        | 253                                      | Sí                                      | 67.1                           | 74               | 69.0                                | No                    | No                                    |
| cadmio         | 1.4                                                              | i     | 14                                                               | i              | 5                                     | 0.5                                   | 0.5                                       | 4.77                                     | Sí                                      | 0.50                           | 1                | 4.02                                | Sí                    | Sí                                    |
| cromo          | 220                                                              | i     | 220                                                              | i              | 100                                   | 10                                    | 10                                        | 509                                      | Sí                                      | 74.2                           | 82               | 101.0                               | Sí                    | Sí                                    |
| cromo vi       | ND                                                               |       | ND                                                               |                | 0.4                                   | 0.4                                   | 0.4                                       | ND                                       | ND                                      |                                | NM               | 2.40                                | ND                    | Sí <sup>(e)</sup>                     |
| cobalto        | 40                                                               | n     | 50                                                               | n              | ND                                    | ND                                    | 40                                        | 65.2                                     | Sí                                      | 13.5                           | 15               | 16.6                                | Sí                    | Sí                                    |
| cobre          | 1,100                                                            | i     | 1,100                                                            | i              | ND                                    | ND                                    | 1,100                                     | 11,738                                   | Sí                                      | 241.2                          | 265              | 10929                               | Sí                    | Sí                                    |
| hierro         | ND                                                               |       | 11,000                                                           | <sup>(b)</sup> | ND                                    | ND                                    | 11,000                                    | 127,202                                  | Sí                                      | 53587                          | 58946            | 54789                               | No                    | No                                    |
| plomo          | 140                                                              | i     | 140                                                              | i              | ND                                    | ND                                    | 140                                       | 137                                      | No                                      | 30.0                           | 33               | 56.0                                | Sí                    | No                                    |
| manganeso      | ND                                                               |       | 360                                                              | <sup>(b)</sup> | ND                                    | ND                                    | 360                                       | 2631                                     | Sí                                      | 672                            | 739              | 692                                 | No                    | No                                    |
| mercurio       | 6.6                                                              | i     | 6.6                                                              | i              | 14                                    | 1.4                                   | 1.4                                       | 2.76                                     | Sí                                      | 0.11                           | 0.12             | 2.68                                | Sí                    | Sí                                    |
| molibdeno      | 5                                                                | n     | 10                                                               | n              | ND                                    | ND                                    | 5                                         | 493.7                                    | Sí                                      | 4.00                           | 4                | 4.66                                | Sí                    | Sí                                    |
| níquel         | ND                                                               |       | 320                                                              | <sup>(b)</sup> | 40                                    | 4                                     | 4                                         | 34.8                                     | Sí                                      | 5.00                           | 6                | 13.5                                | Sí                    | Sí                                    |
| selenio        | 80                                                               | d     | 80                                                               | d              | 63                                    | 0.7                                   | 0.7                                       | 46.8                                     | Sí                                      | 2.00                           | 2                | 41.8                                | Sí                    | Sí                                    |
| plata          | 20                                                               | n     | 20                                                               | n              | ND                                    | ND                                    | 20                                        | 4.95                                     | No                                      | 2.00                           | 2                | 2.25                                | Sí                    | No                                    |
| estroncio      | ND                                                               |       | 9,400                                                            | <sup>(b)</sup> | ND                                    | ND                                    | 9400                                      | 20.5                                     | No                                      | 6.25                           | 7                | 8.8                                 | Sí                    | No                                    |
| talio          | 1                                                                | p     | 1                                                                | p              | ND                                    | ND                                    | 1                                         | 1.0                                      | No                                      | 1.00                           | 1                | 1.00                                | No                    | No                                    |
| titanio        | ND                                                               |       | ND                                                               |                | ND                                    | ND                                    | ND                                        | 582                                      | ND                                      | 5                              | 6                | 24                                  | Sí                    | No                                    |
| uranio         | 23                                                               |       | 23                                                               |                | ND                                    | ND                                    | 23                                        | ND                                       | ND                                      | 329.61                         | NM               | 329.62                              | ND                    | No                                    |
| vanadio        | ND                                                               |       | 110                                                              | <sup>(b)</sup> | ND                                    | ND                                    | 110                                       | 533                                      | Sí                                      | 162                            | 178              | 237.7                               | Sí                    | Sí                                    |
| zinc           | ND                                                               |       | 4,600                                                            | <sup>(b)</sup> | 30                                    | 3                                     | 3                                         | 221                                      | Sí                                      | 57.5                           | 63               | 61.8                                | No                    | No                                    |

Tabla 37      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en el Suelo para la Evaluación de Riesgos a la Salud Humana (continuación)

| Parámetros                            | Lineamientos de Salud Humana del CCME (a,b,c) Para AL | Notas | Lineamientos de Salud Humana del CCME (a,b,c) Para RL | Notas | Normas Panameñas de Suelos Uso Urbano | Normas Panameñas de Suelos Otros Usos | Lineamiento/ Norma Mínima de Salud Humana | Concentración de Impacto Máxima Prevista | ¿Excede el Criterio de Análisis Mínimo? | Línea Base (Tendencia Central) | Línea Base + 10% | (Tendencia Central) Máxima Prevista | ¿>10% de Incremento? | ¿Considerar Como COPC?(d) |
|---------------------------------------|-------------------------------------------------------|-------|-------------------------------------------------------|-------|---------------------------------------|---------------------------------------|-------------------------------------------|------------------------------------------|-----------------------------------------|--------------------------------|------------------|-------------------------------------|----------------------|---------------------------|
| Hidrocarburos Aromáticos Policíclicos |                                                       |       |                                                       |       |                                       |                                       |                                           |                                          |                                         |                                |                  |                                     |                      |                           |
| acenafteno                            | ND                                                    |       | 680                                                   | e     | 470                                   | ND                                    | 470                                       | 0.099                                    | No                                      | 0.04                           | 0.044            | 0.099                               | Sí                   | No                        |
| acenaftileno                          | ND                                                    |       | ND                                                    |       | ND                                    | ND                                    | ND                                        | 0.266                                    | No <sup>6</sup>                         | 0.05                           | 0.055            | 0.266                               | Sí                   | No                        |
| antraceno                             | ND                                                    |       | 3,400                                                 | e     | 100                                   | 45                                    | 45                                        | 0.089                                    | No                                      | 0.05                           | 0.055            | 0.089                               | Sí                   | No                        |
| benzo(a)fluoreno                      | ND                                                    |       | ND                                                    |       | ND                                    | ND                                    | ND                                        | 0.012                                    | No <sup>6</sup>                         | NM                             | NM               | 0.012                               | ND                   | No                        |
| benzo(a)pireno*                       | ND                                                    |       | ND                                                    |       | 10                                    | 1                                     | 1                                         | 0.0551                                   | No                                      | 0.05                           | 0.055            | 0.055                               | No                   | No                        |
| benzo(b,j,k)fluoranteno*              | ND                                                    |       | ND                                                    |       | 100                                   | 10                                    | 10                                        | 0.047                                    | No                                      | NM                             | NM               | 0.047                               | ND                   | No                        |
| benzo(e)pireno                        | ND                                                    |       | ND                                                    |       | ND                                    | ND                                    | ND                                        | 0.00072                                  | No <sup>(f)</sup>                       | NM                             | NM               | 0.001                               | ND                   | No                        |
| benzo(g,h,i)perileno*                 | ND                                                    |       | ND                                                    |       | 230                                   | ND                                    | 230                                       | 0.062                                    | No                                      | 0.05                           | 0.06             | 0.062                               | Sí                   | No                        |
| criseno*                              | ND                                                    |       | ND                                                    |       | 900                                   | 90                                    | 90                                        | 0.060                                    | No                                      | 0.05                           | 0.055            | 0.060                               | Sí                   | No                        |
| dibenzo(a,h)antraceno*                | ND                                                    |       | ND                                                    |       | 10                                    | 1                                     | 1                                         | 0.063                                    | No                                      | 0.05                           | 0.055            | 0.063                               | Sí                   | No                        |
| dibenzotiofeno                        | ND                                                    |       | ND                                                    |       | ND                                    | ND                                    | ND                                        | 0.172                                    | No <sup>(f)</sup>                       | NM                             | NM               | 0.172                               | ND                   | No                        |
| fluoranteno                           | ND                                                    |       | 460                                                   | e     | 200                                   | 20                                    | 20                                        | 0.238                                    | No                                      | 0.05                           | 0.055            | 0.238                               | Sí                   | No                        |
| fluoreno                              | ND                                                    |       | 460                                                   | e     | 500                                   | 50                                    | 50                                        | 0.357                                    | No                                      | 0.05                           | 0.055            | 0.357                               | Sí                   | No                        |
| indeno(1,2,3-c,d)pireno*              | ND                                                    |       | ND                                                    |       | 100                                   | 10                                    | 10                                        | 0.052                                    | No                                      | 0.05                           | 0.055            | 0.052                               | No                   | No                        |
| naftaleno                             | ND                                                    |       | 36                                                    | e     | ND                                    | ND                                    | 36                                        | 4.87                                     | No                                      | 0.05                           | 0.055            | 4.68                                | Sí                   | No                        |
| fenantreno                            | ND                                                    |       | 5                                                     | n     | ND                                    | ND                                    | 5                                         | 1.06                                     | No                                      | 0.05                           | 0.055            | 1.06                                | Sí                   | No                        |
| pireno                                | ND                                                    |       | 340                                                   | e     | ND                                    | ND                                    | 340                                       | 0.299                                    | No                                      | 0.05                           | 0.055            | 0.30                                | Sí                   | No                        |
| B[a]P TPE*                            | 5.3                                                   |       | 5.3                                                   |       | ND                                    | ND                                    | 5.3                                       | 0.130                                    | No                                      | ND                             | ND               | 0.13                                | ND                   | No                        |

(a) Consejo Canadiense de Ministros del Medio Ambiente (CCME 2008); Lineamientos Canadienses de Calidad de Suelos para la Protección de Medio Ambiente y la Salud Humana; Los factores específicos del sitio incluyen: i= ingestión de suelo; c = contacto con el suelo; n = ínterin; d = contacto directo; p = provisional.

(b) En caso que una norma del CCME aplicable no estuviera disponible, se utilizaron, se utilizaron los niveles de análisis de suelo residencial regional para contaminantes químicos en el sitio del Superfondo del Oakridge National Laboratory (Set. 2008) (lineamientos ajustados para reflejar un ILCR de 10<sup>-5</sup>, HQ de 0.2)

(c) Se brindan lineamientos para uso de tierras residenciales (RL) y uso de tierras agrícolas (AL) cuando están disponibles

(d) Un parámetro es considerado como COPC si excede el lineamiento mínimo y la concentración en caso de impacto fue mayor que la concentración de línea base en más de 10%.

(e). Ninguna concentración de fondo está disponible; el COPC será evaluado como parte del total de Cromo

(f) Ninguna norma está disponible; la concentración máxima fue más baja que el criterio mínimo de HAP (es decir, 1 mg/kg); COPC - Contaminante de Interés Potencial

(e) Nivel de análisis regional del APAEU (carcinógenos ajustados para un riesgo de cáncer de 10<sup>-5</sup> y no carcinógenos ajustados para justificar los mecanismos de exposición adicionales (\*0.2)); \* B[a]P TPE – Equivalentes de Potencia Total es la suma de la potencia de cáncer calculada en relación con un B[a]P usando los siguientes factores de equivalencia: benzo(a)antraceno = 0.1, benzo(a)pireno = 1; benzo(b)fluoranteno = 0.1; benzo(k)fluoranteno = 0.1; criseno = 0.01; benzo(g,h,i)perileno = 0.01; dibenzo(a,h)antraceno = 1; indeno(1,2,3-c,d)pireno = 0.1. En el caso en que no se ha detectado un parámetro, se utilizó la mitad del límite de detección.

Nota: Todas las unidades están en miligramos por kilogramo, peso húmedo (mg/kg, de peso húmedo), salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima; ND – No disponible; NM – No medido.

Tabla 38      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en el Suelo para la Evaluación de Riesgos a la Salud Ecológica

| Parámetros     | Lineamientos Ambientales del CCME <sup>(a,c)</sup> para AL | Notas <sup>(b)</sup> | Lineamientos Ambientales del CCME <sup>(a,c)</sup> para RL | Notas <sup>(b)</sup> | Lineamiento Ecológico Mínimo | Concentración de Impacto Máxima Prevista | ¿Excede el Criterio de Análisis Mínimo? | Línea Base (Tendencia Central) | Línea Base + 10% | Tendencia Central) Máxima Prevista | ¿>10% de Incremento? | ¿Considerar Como COPC? <sup>(d)</sup> |
|----------------|------------------------------------------------------------|----------------------|------------------------------------------------------------|----------------------|------------------------------|------------------------------------------|-----------------------------------------|--------------------------------|------------------|------------------------------------|----------------------|---------------------------------------|
| <b>Metales</b> |                                                            |                      |                                                            |                      |                              |                                          |                                         |                                |                  |                                    |                      |                                       |
| aluminio       | ND                                                         |                      | ND                                                         |                      | ND                           | 61,180                                   | ND                                      | 31,476                         | 34,624           | 32,056                             | No                   | No                                    |
| antimonio      | 20                                                         | n                    | 20                                                         | n                    | 20                           | 10.5                                     | No                                      | 10.0                           | 11               | 10.5                               | No                   | No                                    |
| arsénico       | 17                                                         | c                    | 17                                                         | c                    | 17                           | 18.6                                     | Sí                                      | 5.00                           | 6                | 18.3                               | Sí                   | Sí                                    |
| bario          | 750                                                        | n                    | 500                                                        | n                    | 500                          | 253                                      | No                                      | 67.1                           | 74               | 69.0                               | No                   | No                                    |
| cadmio         | 3.8                                                        | i                    | 10                                                         | c                    | 3.8                          | 4.77                                     | Sí                                      | 0.50                           | 1                | 4.02                               | Sí                   | Sí                                    |
| cromo          | 64                                                         | c                    | 64                                                         | c                    | 64                           | 509                                      | Sí                                      | 74.2                           | 82               | 101.0                              | Sí                   | Sí                                    |
| cromo vi       | ND                                                         |                      | ND                                                         |                      | ND                           | ND                                       | ND                                      |                                | NM               | 2.40                               | ND                   | Sí <sup>(e)</sup>                     |
| cobalto        | 40                                                         | n                    | 50                                                         | n                    | 40                           | 65.2                                     | Sí                                      | 13.5                           | 15               | 16.6                               | Sí                   | Sí                                    |
| cobre          | 63                                                         | c                    | 63                                                         | c                    | 63                           | 11,738                                   | Sí                                      | 241.2                          | 265              | 10929                              | Sí                   | Sí                                    |
| hierro         | ND                                                         |                      | ND                                                         |                      | ND                           | 127,202                                  | ND                                      | 53,587                         | 58,946           | 54,789                             | No                   | No                                    |
| plomo          | 70                                                         | i                    | 300                                                        | c                    | 70                           | 137                                      | Sí                                      | 30.0                           | 33               | 56.0                               | Sí                   | Sí                                    |
| manganeso      | ND                                                         |                      | ND                                                         |                      | ND                           | 2,631                                    | ND                                      | 672                            | 739              | 692                                | No                   | No                                    |
| mercurio       | 12                                                         | c                    | 12                                                         | c                    | 12                           | 2.76                                     | No                                      | 0.11                           | 0.12             | 2.68                               | Sí                   | No                                    |
| molibdeno      | 5                                                          | n                    | 10                                                         | n                    | 5                            | 493.7                                    | Sí                                      | 4.00                           | 4                | 4.66                               | Sí                   | Sí                                    |
| níquel         | 50                                                         | c                    | 50                                                         | c                    | 50                           | 34.8                                     | No                                      | 5.00                           | 6                | 13.5                               | Sí                   | No                                    |
| selenio        | 1                                                          | c                    | 1                                                          | c                    | 1                            | 46.8                                     | Sí                                      | 2.00                           | 2                | 41.8                               | Sí                   | Sí                                    |
| plata          | 20                                                         | n                    | 20                                                         | n                    | 20                           | 4.95                                     | No                                      | 2.00                           | 2                | 2.25                               | Sí                   | No                                    |
| estroncio      | ND                                                         |                      | ND                                                         |                      | ND                           | 20.5                                     | ND                                      | 6.25                           | 7                | 8.8                                | Sí                   | Sí <sup>(g)</sup>                     |
| talio          | 1                                                          | i                    | 1.4                                                        | c                    | 1                            | 1.00                                     | No                                      | 1.00                           | 1                | 1.00                               | No                   | No                                    |
| titanio        | ND                                                         |                      | ND                                                         |                      | ND                           | 582                                      | ND                                      | 5                              | 6                | 24                                 | Sí                   | No                                    |
| uranio         | 33                                                         |                      | 500                                                        |                      | 33                           | 0.01                                     | No                                      | 329.61                         | NM               | 329.62                             | ND                   | No                                    |
| vanadio        | 130                                                        | c                    | 130                                                        | c                    | 130                          | 533                                      | Sí                                      | 162                            | 178              | 237.7                              | Sí                   | Sí                                    |
| zinc           | 200                                                        | c                    | 200                                                        | c                    | 200                          | 221                                      | Sí                                      | 57.5                           | 63               | 61.8                               | No                   | No                                    |

Tabla 38      Análisis de Condiciones Pronosticadas de las Operaciones del Proyecto (Impacto) en el Suelo para la Evaluación de Riesgos a la Salud Ecológica (continuación)

| Parámetros                            | Lineamientos Ambientales del CCME <sup>(a,c)</sup> para AL | Notas <sup>(b)</sup> | Lineamientos Ambientales del CCME <sup>(a,c)</sup> para RL | Notas <sup>(b)</sup> | Lineamiento Ecológico Mínimo | Concentración de Impacto Máxima Prevista | ¿Excede el Criterio de Análisis Mínimo? | Línea Base (Tendencia central) | Línea Base + 10% | Tendencia Central) Máxima Prevista | ¿>10% de Incremento? | ¿Considerar como COPC? <sup>(d)</sup> |
|---------------------------------------|------------------------------------------------------------|----------------------|------------------------------------------------------------|----------------------|------------------------------|------------------------------------------|-----------------------------------------|--------------------------------|------------------|------------------------------------|----------------------|---------------------------------------|
| Hidrocarburos Aromáticos Policíclicos |                                                            |                      |                                                            |                      |                              |                                          |                                         |                                |                  |                                    |                      |                                       |
| acenafteno                            | 21.5                                                       | i                    | 21.5                                                       | i                    | 21.5                         | 0.099                                    | No                                      | 0.04                           | 0.044            | 0.099                              | Sí                   | No                                    |
| acenaftileno                          | ND                                                         |                      | ND                                                         |                      | ND                           | 0.266                                    | No <sup>(f)</sup>                       | 0.05                           | 0.055            | 0.266                              | Sí                   | No                                    |
| antraceno                             | 2.5                                                        | c                    | 2.5                                                        | c                    | 2.5                          | 0.089                                    | No                                      | 0.05                           | 0.055            | 0.089                              | Sí                   | No                                    |
| benzo(a)fluoreno                      | ND                                                         |                      | ND                                                         |                      | ND                           | 0.012                                    | No <sup>(f)</sup>                       | NM                             | NM               | 0.012                              | ND                   | No                                    |
| benzo(a)pireno                        | 0.6                                                        | i                    | 0.6                                                        | i                    | 0.6                          | 0.0551                                   | No                                      | 0.05                           | 0.055            | 0.055                              | No                   | No                                    |
| benzo(b,j,k)fluoranteno               | 6.2                                                        | i                    | 6.2                                                        | i                    | 6.2                          | 0.047                                    | No                                      | NM                             | NM               | 0.047                              | ND                   | No                                    |
| benzo(e)pireno                        | ND                                                         |                      | ND                                                         |                      | ND                           | 0.00072                                  | No <sup>(f)</sup>                       | NM                             | NM               | 0.001                              | ND                   | No                                    |
| benzo(g,h,i)perileno                  | ND                                                         |                      | ND                                                         |                      | ND                           | 0.062                                    | No <sup>(f)</sup>                       | 0.05                           | 0.06             | 0.062                              | Sí                   | No                                    |
| criseno                               | 6.2                                                        | i                    | 6.2                                                        | i                    | 6.2                          | 0.060                                    | No                                      | 0.05                           | 0.055            | 0.060                              | Sí                   | No                                    |
| dibenzo(a,h)antraceno                 | ND                                                         |                      | ND                                                         |                      | ND                           | 0.063                                    | No <sup>(f)</sup>                       | 0.05                           | 0.055            | 0.063                              | Sí                   | No                                    |
| dibenzotiofeno                        | ND                                                         |                      | ND                                                         |                      | ND                           | 0.172                                    | No <sup>(f)</sup>                       | NM                             | NM               | 0.172                              | ND                   | No                                    |
| fluoranteno                           | 50                                                         | i                    | 50                                                         | i                    | 50                           | 0.238                                    | No                                      | 0.05                           | 0.055            | 0.238                              | Sí                   | No                                    |
| fluoreno                              | 15.4                                                       | i                    | 15.4                                                       | i                    | 15.4                         | 0.357                                    | No                                      | 0.05                           | 0.055            | 0.357                              | Sí                   | No                                    |
| indeno(1,2,3-c,d)pireno               | ND                                                         |                      | ND                                                         |                      | ND                           | 0.052                                    | No <sup>(f)</sup>                       | 0.05                           | 0.055            | 0.052                              | No                   | No                                    |
| naftaleno                             | 8.8                                                        | i                    | 8.8                                                        | i                    | 8.8                          | 4.87                                     | No                                      | 0.05                           | 0.055            | 4.68                               | Sí                   | No                                    |
| fenantreno                            | 43                                                         | i                    | 43                                                         | i                    | 43                           | 1.064                                    | No                                      | 0.05                           | 0.055            | 1.06                               | Sí                   | No                                    |
| pireno                                | 7.7                                                        | i                    | 7.7                                                        | i                    | 7.7                          | 0.299                                    | No                                      | 0.05                           | 0.055            | 0.299                              | Sí                   | No                                    |

(a) Consejo Canadiense de Ministros del Medio Ambiente (CCME 2008); Lineamientos Canadienses de Calidad de Suelos para la Protección de Medio Ambiente y la Salud Humana.

(b) Los factores específicos del sitio incluyen: i= ingestión de suelo; c = contacto con el suelo; n = ínterin; d = contacto directo; p = provisional.

(c) Se brindan lineamientos para uso de tierras residenciales (RL) y uso de tierras agrícolas (AL) cuando están disponibles.

(d) Un parámetro es considerado como COPC si excede el lineamiento mínimo y la concentración en caso de impacto fue mayor que la concentración de línea base en más de 10%.

(e) Ninguna norma ni ninguna concentración de fondo están disponibles; se considera como COPC porque se consideró el total de Cromo (será evaluado como total de Cromo).

(f) Los HAP sin criterios de análisis fueron analizados de manera conservadora comparados con el criterio para benzo(a)pireno (es decir, 0.6 mg/kg).

(g) Ninguna norma ni ninguna concentración de fondo están disponibles; consideradas porque la concentración prevista fue de >10% desde la línea base.

Nota: Todas las unidades están en miligramos por kilogramo; peso húmedo (mg/kg, de peso húmedo) salvo que se haya indicado de otro modo; < = menos la concentración detectable mínima; COPC - Contaminante de Interés Potencial; ND – No disponible; NM – No medido, n/a = ningún criterio de análisis o dato de línea base está disponible.

**ANEXO XIX**

**APÉNDICE E**

**Evaluación de la Exposición de ERSHE**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**



# 1 EVALUACIÓN DEL EFECTO DE LA EXPOSICIÓN A LA SALUD HUMANA

## 1.1 EVALUACIÓN DE LA EXPOSICIÓN

La evaluación de la exposición consiste de una serie de ecuaciones con el fin de calcular la tasa de absorción química diaria promedio, normalizada al peso corporal (es decir dosis de exposición) para cada combinación CIP-medio-receptor. A continuación se presenta la ecuación utilizada para estimar las dosis de exposición (Health Canada 2007) y las dosis de exposición calculadas:

**Nivel de dosis de ingesta de agua potable contaminada:**

|        |                                                                 |            |
|--------|-----------------------------------------------------------------|------------|
| DRDW = | $CW \times TIA \times FAR_{oral} \times D2 \times D3 \times D4$ | Ecuación 1 |
|        | $PC \times EV$                                                  |            |

donde:

DRDW = nivel de dosis a partir de la ingesta de CIP en el agua potable (mg/kg peso corporal-día)

TIA = tasa de ingesta de agua (L/d)

Cw = concentración de CIP en agua subterránea (mg/L)

FAR<sub>oral</sub> = factor de absorción relativa del tracto gastrointestinal (sin unidad) - se asumió conservadoramente a los RAF como 1

D2 = días de exposición por semana / 7 días

D3 = semanas de exposición por año / 52 semanas

D4 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

**Nivel de dosis de ingesta de alimentos (utilizado para peces, fruta, arroz, carne de vacuno y pollo):**

|       |                                                           |            |
|-------|-----------------------------------------------------------|------------|
| DRF = | $IR\ F \times CF \times FF \times D1 \times D2 \times D3$ | Ecuación 2 |
|       | $PC \times EV$                                            |            |

donde:

DRF = nivel de dosis a partir de la ingesta de CIP en los alimentos (mg/kg peso corporal/día)

TIA = tasa de ingesta de alimentos (kg/día)

CF = Concentración de CIP en alimentos (mg/kg)

FF = fracción de un alimento de la dieta obtenida del área (sin unidad)

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

**Nivel de dosis de ingesta inadvertida de suelos:**

|        |                                                                   |            |
|--------|-------------------------------------------------------------------|------------|
| DRS/TI | $IR\ S/TI \times CS/T \times AF\ S \times D1 \times D2 \times D3$ | Ecuación 3 |
|        | $PC \times EV$                                                    |            |

donde:

DRS = dosis estimada a partir de la ingesta de CIP en los sedimentos (mg/kg peso corporal/día)

IRS = tasa de ingesta de sedimentos (kg/día)

CS = concentración de CIP en los sedimentos (mg/kg)

AFS = factor de biodisponibilidad a través de la ingesta de sedimentos (sin unidad) – se asumió conservadoramente como 1 para esta evaluación de riesgos

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Contacto dérmico con los sedimentos:

|        |                                            |            |
|--------|--------------------------------------------|------------|
| DRDC = | CS/T x SA x AD x AFDC x UCF x D1 x D2 x D3 | Ecuación 4 |
|        | PC x EV                                    |            |

donde:

DRDC = nivel de dosis a partir del contacto dérmico con CIP en los sedimentos (mg/kg peso corporal-día)

SA = área de superficie cutánea disponible para el contacto dérmico (cm<sup>2</sup>/evento)

AD = factor de adherencia (suelo a piel; mg/cm<sup>2</sup>)

CS = concentración de CIP en los sedimentos (mg/kg)

AFDC = biodisponibilidad a través del contacto dérmico (sin unidad) – se asumió conservadoramente como 1 para esta evaluación de riesgos

UCF = factor de conversión de unidades (1 x 10<sup>-6</sup> kg/mg)

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Ingesta inadvertida de agua superficial:

|        |                                   |            |
|--------|-----------------------------------|------------|
| DRSI = | TIAS x CDW x AFGIT x D1 x D2 x D3 | Ecuación 5 |
|        | PC x EV                           |            |

Donde:

DRDW = nivel de dosis a partir de la ingesta de CIP en el agua superficial (mg/kg peso corporal/día)

TIAS = tasa de ingesta de agua superficial (L/día)

CS = concentración de CIP en agua potable (mg/L)

AFGIT = factor de biodisponibilidad a través del tracto gastrointestinal

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Contacto dérmico con el agua superficial para sustancias orgánicas:

|        |                               |            |
|--------|-------------------------------|------------|
| DRDC = | SA x DA evento x D1 x D2 x D3 | Ecuación 6 |
|        | PC x EV                       |            |

donde:

DRDC = nivel de dosis a partir del contacto dérmico con CIP en agua superficial (mg/kg peso corporal-día)

SA = área de superficie cutánea disponible para el contacto dérmico (cm<sup>2</sup>)

Evento DA = dosis absorbida por evento (mg/cm<sup>2</sup>-evento) (las ecuaciones se describen más adelante)

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Nivel de dosis de ingesta inadvertida de suelos:

|        |                                               |            |
|--------|-----------------------------------------------|------------|
| DRSI = | CS x IRS x RAF <sub>Oral</sub> x D1 x D2 x D3 | Ecuación 7 |
|        | PC x EV                                       |            |

donde:

DRI = dosis estimada a partir de la ingesta de CIP en el suelos (mg/kg peso corporal-día)

IRS = tasa de ingesta de sedimentos (kg/día)

CS = concentración de CIP en el suelo (mg/kg)

FA<sub>Roral</sub> = biodisponibilidad a través de la ingesta de suelo, es decir, factor de absorción relativa del tracto gastrointestinal (sin unidad)

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Nivel de dosis de contacto dérmico con el suelo:

|        |                                                                                                                                            |            |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------|------------|
| DRDC = | $\frac{[(CS \times SAH \times SLH) + (CS \times SAO \times SLO)] \times RAF_{\text{dérmica}} \times D1 \times D2 \times D3}{PC \times EV}$ | Ecuación 8 |
|        |                                                                                                                                            |            |

donde:

DRDC = nivel de dosis a partir del contacto dérmico con CIP en el suelo (mg/kg peso corporal-día)

SAH = área de superficie cutánea disponible para el contacto dérmico (manos) (cm<sup>2</sup>)

SLH = carga de suelo para la piel expuesta (manos) (kg/m<sup>2</sup>-día)

SAO = área de superficie cutánea disponible para el contacto dérmico (áreas distintas de las manos) (m<sup>2</sup>)

SLO = carga de suelo para la piel expuesta (áreas distintas de las manos) (kg/m<sup>2</sup>-día)

CS = concentración de CIP en el suelo (mg/kg)

RAFDC = biodisponibilidad a través del contacto dérmico (sin unidad)

D1 = días de exposición por semana / 7 días

D2 = semanas de exposición por año / 52 semanas

D3 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Nivel de dosis de inhalación de partículas de suelo contaminadas:

|        |                                                                                              |            |
|--------|----------------------------------------------------------------------------------------------|------------|
| DRIH = | $Cs \times IRA \times Paire \times RAF_{\text{inh}} \times D1 \times D2 \times D3 \times D4$ | Ecuación 9 |
|        | $PC \times EV$                                                                               |            |

donde:

DRIH = nivel de dosis a partir de la inhalación de CIP en las partículas transportadas por el aire (mg/kg peso corporal-día)

IRA = tasa de inhalación del receptor (m<sup>3</sup>/hora)

CS = concentración de CIP en el suelo (mg/kg)

Paire = concentración de material particulado en el aire (kg/m<sup>3</sup>)

RAF<sub>inh</sub> = biodisponibilidad a través de la inhalación (sin unidad)

D1 = horas de exposición por día (horas/día)

D2 = días de exposición por semana / 7 días

D3 = semanas de exposición por año / 52 semanas

D4 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### Nivel de dosis de inhalación de aire contaminante:

|       |                        |             |
|-------|------------------------|-------------|
| DRV = | CA x D1 x D2 x D3 x D4 | Ecuación 10 |
|       | EV                     |             |

donde:

DRV = nivel de dosis a partir de la inhalación de CIP en el aire ( $\text{mg}/\text{m}^3$ )

CS = concentración de CIP en el aire ( $\text{mg}/\text{m}^3$ )

AFinh = biodisponibilidad vía inhalación (sin unidad) – se asumió conservadoramente como 1

D1 = horas de exposición por día /24 horas)

D2 = días de exposición por semana / 7 días

D3 = semanas de exposición por año / 52 semanas

D4 = total de años de exposición del área (sólo para cancerígenos)

PC = peso corporal (kg)

EV = expectativa de vida (años) (sólo para cancerígenos)

### 1.1.1 Cálculo de la dosis dérmica absorbida por el contacto con el agua superficial

El método para calcular la dosis dérmica absorbida es el recomendado por USEPA (2004), la absorción dérmica se basa en un modelo de dos compartimentos el cual consta de dos capas: el estrato o capa córnea y la epidermis viable. El modelo describe la absorción de CIP del agua a través de la piel como una función del estrato o capa córnea y la duración del evento (USEPA 2004), dicho estrato o capa córnea funciona como la barrera principal para los CIP. Las siguientes ecuaciones se utilizan para calcular la dosis absorbida por la piel para CIP inorgánicos.

### Dosis absorbida por la piel (evento DA) para sustancias inorgánicas en agua superficial:

|           |                                           |             |
|-----------|-------------------------------------------|-------------|
| DAevento= | $K_p \times C_w \times t_{\text{evento}}$ | Ecuación 11 |
|-----------|-------------------------------------------|-------------|

donde:

DAevento = dosis absorbida por evento ( $\text{mg}/\text{cm}^2\text{-evento}$ )

FA = agua absorbida por la fracción (sin unidad)

$K_p$  = coeficiente de permeabilidad dérmica del compuesto en el agua ( $\text{cm}/\text{hora}$ ), específico por químico y obtenido de USEPA (2004a)

$C_w$  = concentración de químicos en el agua ( $\text{mg}/\text{cm}^3$ )

### **1.1.2 Parámetros de exposición**

A continuación en la Tabla 1 se presenta los parámetros de exposición de los receptores utilizados en los cálculos. Cuando no se dispuso de información específica para el área, se utilizó los valores estándar basados en fuentes publicadas (USEPA 1997, Health Canada 2007).

La información específica para el área relativa a la frecuencia de la ingesta de alimentos y actividades se obtuvo mediante entrevistas efectuadas por el Equipo Socioeconómico (Apéndice XX). Se recabó información semicuantitativa limitada con respecto a las porciones de alimentos consumidos y se complementó con información de un estudio en los patrones de estado nutricional y consumo de alimentos en Panamá (República de Panamá).

La información sobre el consumo de alimentos para varias comunidades dentro del área de estudio se presenta en las Tablas 2 a 9, la relativa a las comunidades costeras tomó como base la información del Río Caimito, en el caso de las comunidades agrícolas se tomó como base la información de San Benito, Coclesito y Los Molejones y finalmente para las comunidades indígenas, se tomó como base la información de Nuevo Sinaí y Nuevo Lucha. En la Tabla 10 se presenta las tasas de consumo de alimentos en la República de Panamá (2002, 2006).

Tabla 1 Características del Receptor y Parámetros de Exposición

| Parámetros                                                 | Niño de Comunidad Costera<br>(6 meses a 4 años) | Adulto de Comunidad Costera<br>(mayor de 20 años) | Niño de Comunidad Indígena<br>(6 meses a 4 años) | Adulto de Comunidad Indígena<br>(mayor de 20 años) | Niño de Comunidad Agrícola<br>(6 meses a 4 años) | Adulto de Comunidad Agrícola<br>(mayor de 20 años) | Niño de los Alrededores del Cerco Perimetral<br>(6 meses a 4 años) | Adulto de los Alrededores del Cerco Perimetral<br>(mayor de 20 años) |
|------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------------------------------------|----------------------------------------------------|--------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------|
| peso corporal (kg)                                         | 16.5                                            | 70.7                                              | 16.5                                             | 70.7                                               | 16.5                                             | 70.7                                               | 16.5                                                               | 70.7                                                                 |
| Vías de Ingesta de Alimentos y Agua Potable:               |                                                 |                                                   |                                                  |                                                    |                                                  |                                                    |                                                                    |                                                                      |
| tasa de ingesta de agua potable (L/día) <sup>(a)</sup>     | 0.9                                             | 2.25                                              | 0.9                                              | 2.25                                               | 0.9                                              | 2.25                                               | NA                                                                 | NA                                                                   |
| días/año de exposición - agua potable                      | 365/365                                         | 365/365                                           | 365/365                                          | 365/365                                            | 365/365                                          | 365/365                                            | NA                                                                 | NA                                                                   |
| tasa de ingesta de peces (kg/día) <sup>(b)</sup>           | 0.005                                           | 0.025                                             | 0.005                                            | 0.025                                              | 0.005                                            | 0.025                                              | NA                                                                 | NA                                                                   |
| fracción de peces consumida del área                       | 0.5                                             | 0.5                                               | 1                                                | 1                                                  | 0.25                                             | 0.25                                               | NA                                                                 | NA                                                                   |
| días/año de exposición - peces                             | 250/365                                         | 250/365                                           | 180/365                                          | 180/365                                            | 104/365                                          | 104/365                                            | NA                                                                 | NA                                                                   |
| tasa de ingesta de frutas (kg/día) <sup>(b)</sup>          | 0.025                                           | 0.251                                             | 0.025                                            | 0.251                                              | 0.025                                            | 0.251                                              | NA                                                                 | NA                                                                   |
| fracción de fruta consumida del área                       | 0.3                                             | 0.3                                               | 1                                                | 1                                                  | 0.5                                              | 0.5                                                | NA                                                                 | NA                                                                   |
| días/año de exposición - fruta                             | 250/365                                         | 250/365                                           | 180/365                                          | 180/365                                            | 365/365                                          | 365/365                                            | NA                                                                 | NA                                                                   |
| tasa de ingesta de arroz (kg/día) <sup>(b)</sup>           | 0.049                                           | 0.211                                             | 0.049                                            | 0.211                                              | 0.049                                            | 0.211                                              | NA                                                                 | NA                                                                   |
| fracción de arroz consumida del área                       | 0.3                                             | 0.3                                               | 1                                                | 1                                                  | 0.5                                              | 0.5                                                | NA                                                                 | NA                                                                   |
| días/año de exposición - arroz                             | 365/365                                         | 365/365                                           | 200/365                                          | 200/365                                            | 365/365                                          | 365/365                                            | NA                                                                 | NA                                                                   |
| tasa de ingesta de carne de vacuno (kg/día) <sup>(b)</sup> | 0.013                                           | 0.0557                                            | 0.013                                            | 0.0557                                             | 0.013                                            | 0.0557                                             | NA                                                                 | NA                                                                   |
| fracción de carne de vacuno consumida del área             | 0.2                                             | 0.2                                               | 0                                                | 0                                                  | 0                                                | 0                                                  | NA                                                                 | NA                                                                   |
| días/año de exposición - carne vacuno                      | 52/365                                          | 53/365                                            | 0                                                | 0                                                  | 25/365                                           | 25/365                                             | NA                                                                 | NA                                                                   |
| tasa de ingesta de pollo (kg/día) <sup>(b)</sup>           | 0.021                                           | 0.09                                              | 0.021                                            | 0.09                                               | 0.021                                            | 0.09                                               | NA                                                                 | NA                                                                   |
| fracción de pollo consumida del área                       | 0.5                                             | 0.5                                               | 0.5                                              | 0.5                                                | 0.3                                              | 0.3                                                | NA                                                                 | NA                                                                   |
| días/año de exposición - pollo                             | 313/365                                         | 313/365                                           | 25/365                                           | 25/365                                             | 156/365                                          | 156/365                                            | NA                                                                 | NA                                                                   |



Tabla 1 Características del Receptor y Parámetros de Exposición

| Parámetros                                                                                        | Niño de Comunidad Costera<br>(6 meses a 4 años)                          | Adulto de Comunidad Costera<br>(mayor de 20 años)                        | Niño de Comunidad Indígena<br>(6 meses a 4 años)                         | Adulto de Comunidad Indígena<br>(mayor de 20 años)                       | Niño de Comunidad Agrícola<br>(6 meses a 4 años)                         | Adulto de Comunidad Agrícola<br>(mayor de 20 años)                       | Niño de los Alrededores del Cerco Perimetral<br>(6 meses a 4 años) | Adulto de los Alrededores del Cerco Perimetral<br>(mayor de 20 años) |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------|----------------------------------------------------------------------|
| Vías de Contacto con el Agua Superficial y los Sedimentos:                                        |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                    |                                                                      |
| Ingesta incidental de agua superficial (L/evento)                                                 | 0.05                                                                     | 0.05                                                                     | 0.05                                                                     | 0.05                                                                     | 0.05                                                                     | 0.05                                                                     | NA                                                                 | NA                                                                   |
| área de superficie dérmica disponible para el contacto con el agua superficial (cm <sup>2</sup> ) | 3010                                                                     | 9110                                                                     | 3010                                                                     | 9110                                                                     | 3010                                                                     | 9110                                                                     | NA                                                                 | NA                                                                   |
| duración del evento (hora/evento)                                                                 | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | NA                                                                 | NA                                                                   |
| Ingesta incidental de sedimentos (mg/día)                                                         | 80                                                                       | 20                                                                       | 80                                                                       | 20                                                                       | 80                                                                       | 20                                                                       | NA                                                                 | NA                                                                   |
| área de superficie dérmica expuesta (cm <sup>2</sup> )                                            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | NA                                                                 | NA                                                                   |
| factor de adherencia sedimento a piel (g/cm <sup>2</sup> /evento)                                 | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | NA                                                                 | NA                                                                   |
| eventos por día                                                                                   | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | NA                                                                 | NA                                                                   |
| días por semana de exposición                                                                     | 2/7                                                                      | 2/7                                                                      | 7/7                                                                      | 7/7                                                                      | 5/7                                                                      | 5/7                                                                      | NA                                                                 | NA                                                                   |
| semanas por año de exposición                                                                     | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | NA                                                                 | NA                                                                   |
| horas por día de exposición (horas/día)                                                           | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | NA                                                                 | NA                                                                   |
| días por semana de exposición (días)                                                              | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | NA                                                                 | NA                                                                   |
| semanas por año de exposición (semanas)                                                           | 35                                                                       | 35                                                                       | 35                                                                       | 35                                                                       | 35                                                                       | 35                                                                       | NA                                                                 | NA                                                                   |
| Vías De Contacto Con El Suelo                                                                     |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                    |                                                                      |
| tasa de ingesta incidental de suelos (mg/día)                                                     | 80                                                                       | 20                                                                       | 80                                                                       | 20                                                                       | 80                                                                       | 20                                                                       | 80                                                                 | 20                                                                   |
| área de superficie dérmica disponible para el contacto (cm <sup>2</sup> /evento)                  | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)              | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)            | 430 (manos)<br>890 (brazos)<br>1690 (piernas)<br>430 (pies)        | 890 (manos)<br>2230 (brazos)<br>5720 (piernas)<br>1200 (pies)        |

Tabla 1 Características del Receptor y Parámetros de Exposición

| Parámetros                                                                            | Niño de Comunidad Costera<br>(6 meses a 4 años)                          | Adulto de Comunidad Costera<br>(mayor de 20 años)                        | Niño de Comunidad Indígena<br>(6 meses a 4 años)                         | Adulto de Comunidad Indígena<br>(mayor de 20 años)                       | Niño de Comunidad Agrícola<br>(6 meses a 4 años)                         | Adulto de Comunidad Agrícola<br>(mayor de 20 años)                       | Niño de los Alrededores del Cerco Perimetral<br>(6 meses a 4 años)       | Adulto de los Alrededores del Cerco Perimetral<br>(mayor de 20 años)     |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|
| factores de adherencia suelo a piel (mg/cm <sup>2</sup> -evento)                      | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) | 1 x 10 <sup>-4</sup> (manos)<br>1 x 10 <sup>-5</sup> (brazo/pierna/pies) |
| factor de emisión de material particulado (kg/m <sup>3</sup> )                        | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  | 7.6 x 10 <sup>-10</sup>                                                  |
| proporción de días secos (PPD)                                                        | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     | 0.47                                                                     |
| tasa de inhalación (m <sup>3</sup> /hora)                                             | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    |
| duración del evento (hora/evento)                                                     | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        | 2                                                                        |
| eventos por día                                                                       | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        | 1                                                                        |
| días por semana de exposición - ingesta de suelo e inhalación de material particulado | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      | 7/7                                                                      |
| días por semana de exposición - contacto dérmico                                      | 2/7                                                                      | 2/7                                                                      | 7/7                                                                      | 7/7                                                                      | 5/7                                                                      | 5/7                                                                      | 5/7                                                                      | 5/7                                                                      |
| semanas por año de exposición                                                         | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    | 52/52                                                                    |
| Vías De Inhalación De Vapores:                                                        |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |
| tasa de inhalación (m <sup>3</sup> /hora)                                             | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    | 0.3875                                                                   | 0.658                                                                    |
| horas por día                                                                         | 2                                                                        | 2                                                                        | 10                                                                       | 10                                                                       | 10                                                                       | 10                                                                       | 10                                                                       | 10                                                                       |
| días por año                                                                          | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  | 365/365                                                                  |
| Tiempos Promedio (Sólo Cancerígenos):                                                 |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |                                                                          |
| duración de la exposición (años)                                                      | n/a                                                                      | 56 <sup>(c)</sup> /30 <sup>(d)</sup>                                     | NA                                                                       | 56 <sup>(c)</sup> /30 <sup>(d)</sup>                                     | NA                                                                       | 56 <sup>(c)</sup> /30 <sup>(d)</sup>                                     | NA                                                                       | 56 <sup>(c)</sup> /30 <sup>(d)</sup>                                     |
| expectativa de vida (años)                                                            | n/a                                                                      | 75                                                                       | NA                                                                       | 75                                                                       | NA                                                                       | 75                                                                       | NA                                                                       | 75                                                                       |

<sup>(a)</sup> valores de *Health Canada* x 1.5 para considerar un clima más cálido  
<sup>(b)</sup> tasas de consumo de alimentos a partir de una encuesta sobre la dieta de los panameños (República de Panamá, 2002; 2006)  
<sup>(c)</sup> estimado de exposición de límite superior.  
<sup>(d)</sup> estimado de exposición de tendencia central.

Notas: kg = kilogramos, L/día = litros por día, kg/día = kilogramos por día, L/evento = litros por evento, cm<sup>2</sup> = centímetros cuadrados, hora/evento = horas por evento, mg/día = miligramos por día, g/cm2/evento = gramos por centímetros cuadrados por evento, hora/día = horas por día, mg/cm2/evento = miligramos por centímetro cuadrado por día, kg/m3 = kilogramos por metro cúbico, m<sup>3</sup>/hora = metros cúbicos por hora

**Tabla 2 Consumo de Alimentos en Nuevo San José**

| Producto                             | Frecuencia (semanal) | Cantidad Promedio por Familia | Fuente |         |
|--------------------------------------|----------------------|-------------------------------|--------|---------|
|                                      |                      |                               | Local  | Externa |
| Peces                                | 0                    | 0                             | -      | -       |
| Pollo                                | 3                    | 2.5 libras                    |        | x       |
| huevos                               | 7                    | 2 unidades/persona            | x      |         |
| carne de vacuno                      | a veces              | 2 libras                      |        | x       |
| cerdo                                | 0                    | 0                             | -      | -       |
| leche y productos lácteos            | 0                    | 0                             | -      | -       |
| cultivos                             | 7                    | 2.5 libras                    | x      |         |
| caza                                 | a veces              | se consume todo el animal     | -      | -       |
| otros (especificar): atún y sardinas | 2-3                  | 3 latas                       |        | x       |

**Tabla 3 Consumo de Alimentos en Coclesito**

| Producto                  | Frecuencia (semanal) | Cantidad Promedio por Familia | Fuente |                       |
|---------------------------|----------------------|-------------------------------|--------|-----------------------|
|                           |                      |                               | Local  | Externa               |
| peces                     | 1                    | 1.5 libras                    | x      | X (principalmente)    |
| pollo                     | a diario             | 2.5 libras                    |        | X (normalmente local) |
| huevos                    | 2                    | 1 unidad/persona              | x      | x                     |
| carne de vacuno           | 1-2/mes              | NA                            |        | X                     |
| cerdo                     | 1                    | 2 libras                      | X      |                       |
| leche y productos lácteos | 3                    | SI                            | X      |                       |
| cultivos                  | 2                    | SI                            | X      |                       |
| caza                      | 1/año (iguana)       | SI                            | X      |                       |
| otros (especificar)       | 1                    | 2 latas                       |        | X                     |

Notas: SI - sin información, NA - no aplicable

**Tabla 4 Consumo de Alimentos en Los Molejones**

| Producto                  | Frecuencia (semanal) | Cantidad Promedio por Familia | Fuente |         |
|---------------------------|----------------------|-------------------------------|--------|---------|
|                           |                      |                               | Local  | Externa |
| peces                     | 1                    | 4 libras                      |        | X       |
| pollo                     | a veces              | 3 libras                      | X      |         |
| huevos                    | 1                    | 1 unidad                      | X      |         |
| carne de vacuno           | a veces              | 4 libras                      |        | X       |
| cerdo                     | n/a                  | NA                            | NA     | NA      |
| leche y productos lácteos | n/a                  | NA                            | NA     | NA      |
| cultivos                  | a diario             | 3-5 libras                    | X      |         |
| caza                      | a veces              | consumo familiar              | X      |         |
| otros (especificar)       | 2/día                | 2 latas                       |        | X       |

Notas: NA - no aplicable.

**Tabla 5 Consumo de Alimentos en Nazareth**

| Producto                  | Frecuencia (semanal) | Cantidad Promedio por Familia | Fuente |         |
|---------------------------|----------------------|-------------------------------|--------|---------|
|                           |                      |                               | Local  | Externa |
| peces                     | 1                    | 2 libras                      |        | X       |
| pollo                     | a diario             | 2 libras                      |        | X       |
| huevos                    | 2                    | SI                            |        | X       |
| carne de vacuno           | 1/mes                | SI                            |        | X       |
| cerdo                     | NA                   | NA                            | NA     | NA      |
| leche y productos lácteos | muy rara vez         | insignificante                |        | X       |
| cultivos                  | 1                    | 2 libras                      | X      |         |
| caza                      | SI                   | SI                            | NA     | NA      |
| otros (especificar)       | SI                   | SI                            |        |         |

Notas: SI - sin información, NA - no aplicable

**Tabla 6 Consumo de Alimentos en San Benito**

| Producto                  | Frecuencia (semanal) | Cantidad Promedio por Familia (en libras) | Fuente |         |
|---------------------------|----------------------|-------------------------------------------|--------|---------|
|                           |                      |                                           | Local  | Externa |
| peces                     | 7                    | 10 libras                                 | X      |         |
| pollo                     | 3                    | 5 libras                                  |        | X       |
| huevos                    | 3                    | 1 unidad/persona                          |        | X       |
| carne de vacuno           | NA                   | NA                                        | NA     | NA      |
| cerdo                     | NA                   | NA                                        | NA     | NA      |
| leche y productos lácteos | NA                   | NA                                        | NA     | NA      |
| cultivos                  | 2                    | 2 libras                                  | X      |         |
| caza                      | NA                   | NA                                        | NA     | NA      |
| otros (especificar)       | 2                    | 3 latas                                   |        | X       |

Notas: SI - sin información, NA - no aplicable

**Tabla 7 Consumo de alimentos en Río Caimito**

| Producto                  | Frecuencia (semanal) | Cantidad Promedio por Familia (en libras) | Fuente |         |
|---------------------------|----------------------|-------------------------------------------|--------|---------|
|                           |                      |                                           | Local  | Externa |
| peces                     | a diario             | 5 libras                                  | X      | X       |
| pollo                     | a diario             | 12 libras                                 | X      | X       |
| huevos                    | a diario             | 1 unidad/persona                          | X      |         |
| carne de vacuno           | ocasional            | 5 libras                                  | X      | X       |
| cerdo                     | ocasional            | 5 libras                                  | X      | X       |
| leche y productos lácteos | 1-2/semana           | 1 vaso/persona                            | X      |         |
| cultivos                  | a diario             | 50 libras                                 | X      |         |
| caza                      | SI                   | se consume todo el animal                 | X      |         |
| otros (especificar)       | a diario             | 2 latas                                   |        | X       |

Notas: SI - sin información, NA - no aplicable

**Tabla 8 Consumo de Alimentos en San Juan de Turbe**

| Producto                               | Frecuencia (semanal) | Cantidad Promedio por Familia (en libras) | Fuente |         |
|----------------------------------------|----------------------|-------------------------------------------|--------|---------|
|                                        |                      |                                           | Local  | Externa |
| peces                                  | 2                    | SI                                        |        | X       |
| pollo                                  | 6                    | SI                                        |        | X       |
| huevos                                 | 1.5                  | SI                                        |        | X       |
| carne de vacuno                        | NA                   | NA                                        | NA     | NA      |
| cerdo                                  | NA                   | NA                                        | NA     | NA      |
| leche y productos lácteos              | NA                   | NA                                        | NA     | NA      |
| cultivos                               | a diario             | SI                                        | X      |         |
| caza                                   | 1/año                | SI                                        | X      |         |
| otros (especificar):<br>atún, sardinas | varias veces/semana  | SI                                        |        | X       |

Notas: SI - sin información, NA - no aplicable

**Tabla 9 Consumo de Alimentos en Villa del Carmen**

| Producto                     | Frecuencia (semanal) | Cantidad Promedio por Familia (en libras) | Fuente |         |
|------------------------------|----------------------|-------------------------------------------|--------|---------|
|                              |                      |                                           | Local  | Externa |
| peces                        | 4                    | 10 libras                                 |        | X       |
| pollo                        | a diario             | 2 libras                                  |        | X       |
| huevos                       | 1                    | 0.5 unidad/persona                        |        | X       |
| carne de vacuno              | 2/mes                | 2.5 libras                                |        | X       |
| cerdo                        | 1/año                | 2 libras                                  | X      |         |
| leche y productos lácteos    | 2/mes                | 1 lata                                    |        | X       |
| cultivos                     | a diario             | 1 libras                                  | X      |         |
| caza                         | NA                   | NA                                        | NA     | NA      |
| otros (especificar):<br>atún | 2/mes                | 2 latas                                   |        | X       |

Notas: SI - sin información, NA - no aplicable.

**Tabla 10 Resumen de Tasas de Consumo de Alimentos para Panamá  
 (República de Panamá 2002)**

| Producto                                         | Consumo de Alimentos<br>(Alimento/Día/Persona [g]) <sup>(a)</sup> |
|--------------------------------------------------|-------------------------------------------------------------------|
| <b>carne de vacuno</b>                           |                                                                   |
| babilla (parte superior de la pierna de la vaca) | 26.15                                                             |
| costillas                                        | 8.56                                                              |
| carne picada                                     | 10.62                                                             |
| carne de ternera                                 | 1.89                                                              |
| ubre                                             | 8.46                                                              |
| total                                            | 55.68                                                             |
| pollo                                            | 90.16                                                             |
| <b>pescado</b>                                   |                                                                   |
| cojinova (tipo de jurel)                         | 7.83                                                              |
| róbalo                                           | 10.17                                                             |
| atún                                             | 6.31                                                              |
| total                                            | 24.31                                                             |
| arroz                                            | 211.41                                                            |
| <b>vegetales</b>                                 |                                                                   |
| ajo                                              | 2.78                                                              |
| cebollas                                         | 15.5                                                              |
| lechuga                                          | 14.08                                                             |
| batata                                           | 13.03                                                             |
| papas                                            | 24.34                                                             |
| banano                                           | 49.39                                                             |
| tomate                                           | 11.67                                                             |
| yuca                                             | 12.88                                                             |
| zanahorias                                       | 8.44                                                              |
| <b>frutas</b>                                    |                                                                   |
| guineo (tipo de banano)                          | 32.39                                                             |
| manzana                                          | 8.2                                                               |
| naranja                                          | 58.96                                                             |
| <b>líquidos</b>                                  |                                                                   |
| salsa de tomate                                  | 5.37                                                              |
| pasta de tomate                                  | 9.72                                                              |
| sopas instantáneas                               | 3.45                                                              |
| jugo de naranja                                  | 51.75                                                             |
| mayonesa                                         | 3.32                                                              |
| café                                             | 4.85                                                              |
| jugo de fruta                                    | 34.22                                                             |
| agua con gas                                     | 50.74                                                             |

**Tabla 10      Resumen de Tasas de Consumo de Alimentos para Panamá  
(República de Panamá 2002) (continuación)**

| <b>Producto</b> | <b>Consumo de Alimentos<br/>(Alimento/Día/Persona [g])<sup>(a)</sup></b> |
|-----------------|--------------------------------------------------------------------------|
| té              | 0.18                                                                     |
| sal             | 6.67                                                                     |
| total           | 160.1                                                                    |

<sup>(a)</sup> consumo de alimentos calculado para un adulto promedio correspondiente 2,305 calorías



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**ANEXO XIX**

**APÉNDICE F**

**Evaluación de la Toxicidad**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

# **1 EVALUACIÓN DE LA TOXICIDAD**

## **1.1 VALORES REFERENCIALES DE TOXICIDAD (VRT)**

La evaluación de toxicidad se realizó para todos los CIP e involucró la identificación de los posibles efectos tóxicos de los químicos y la selección de los valores referenciales de toxicidad (VRT) para cada uno de ellos. Los VRT incluyen dosis de referencia (DR) e ingestas diarias tolerables (mg/kg-día), (IDT) y concentraciones referenciales (CR) (mg/ m<sup>3</sup>) para agentes no cancerígenos y factores de potencia o pendiente de cáncer para agentes cancerígenos. Una dosis o concentración de referencia representa una ingesta diaria tolerable que receptores humanos pueden recibir cada día durante toda su vida sin experimentar ningún impacto significativo o negativo para la salud. Los factores de la pendiente se utilizan para calcular el riesgo cancerígeno y se definen como la probabilidad máxima plausible de que una persona desarrolle cáncer como resultado de la exposición durante toda su vida a un posible agente cancerígeno.

Se calcularon los valores de los cocientes de riesgo y de los riesgos incrementales de desarrollar cáncer de por vida (ILCR) para agentes cancerígenos, en lo posible.

Los valores de toxicidad utilizados en la evaluación de riesgos se obtuvieron principalmente de la Organización Mundial de la Salud (OMS 2000, 2008), el Sistema Integrado de Información de Riesgos de USEPA (USEPA IRIS 2009a) y *Health Canada* (Health Canada 2009). Cuando no se dispuso de valores referenciales de la OMS, USEPA IRIS o *Health Canada* para contaminantes de interés potencial, se utilizaron otras fuentes como valores referenciales de toxicidad provisionales revisados por expertos del Centro de Apoyo Técnico a Riesgos para la Salud del Centro Nacional para el Superfondo de Evaluación Ambiental (USEPA 2009c o RIVM 2001).

## **1.2 BIODISPONIBILIDAD**

La biodisponibilidad (también conocida como eficiencia de absorción) es una medida de la cantidad de un químico que se absorbe y retiene dentro del cuerpo. Pudiera ser importante considerar la biodisponibilidad en las siguientes circunstancias (USEPA 1989):

- si el medio de exposición es diferente al medio que se toma como base para el valor referencial de toxicidad (por ejemplo, la exposición proviene del suelo, aunque el valor referencial de toxicidad se basa en la exposición al agua);
- si la ruta de exposición es distinta a la ruta de exposición utilizada en el estudio con el fin de derivar el valor referencial de toxicidad (por ejemplo, ruta de exposición oral, aunque se basa en un estudio de inhalación); o

- el valor referencial de toxicidad derivado por la agencia de regulación se ajusta a la biodisponibilidad.

En la evaluación de la salud humana los estimados de exposición no se ajustan a la biodisponibilidad debido a que en la mayoría de los casos, los VRT se expresan como la dosis administrada (es decir, la cantidad que ingresó al cuerpo), en lugar de la dosis absorbida (es decir, la cantidad absorbida y retenida en el cuerpo) y no se dispone de información sobre la biodisponibilidad.

### ***Consideraciones Especiales – Arsénico en los Peces***

Se ha reportado que las formas de arsénico en peces y mariscos (es decir, arsenobetaina y arsenocolina) son esencialmente no tóxicas. Sin embargo un pequeño porcentaje en tejidos de los peces pudiera ser una forma inorgánica tóxica, por lo tanto se utiliza un contenido de 10% de arsénico inorgánico en los peces para calcular las exposiciones al arsénico a través de ellos (ATSDR 2005).

En el caso de la exposición dérmica se utilizaron los factores de absorción relativa proporcionados por *Health Canada* (2009). En ausencia de valores establecidos por *Health Canada* (2009), se seleccionaron factores de absorción relativa del Ministerio del Medio Ambiente de Ontario (2008).

## **1.3 CLASIFICACIÓN DE CONTAMINANTES**

Diversas organizaciones han desarrollado sistemas de clasificación basados en las propiedades cancerígenas de los químicos. En la Tabla 1 se presenta los sistemas de clasificación de la Agencia Internacional para la Investigación del Cáncer (IARC 2008), USEPA (2009a) y *Health Canada* (1996).

**Tabla 1                    Sistemas de Clasificación de Agentes Cancerígenos Utilizados por IARC, USEPA y Health Canada**

| <b>IARC<sup>(a)</sup></b> | <b>USEPA<sup>(b)</sup></b> | <b>Health Canada<sup>(c)</sup></b> | <b>Descripción</b>                                                                                                                        |
|---------------------------|----------------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>grupo 1</b>            | <b>grupo A</b>             | <b>grupo I</b>                     | agente cancerígeno para los seres humanos                                                                                                 |
| <b>grupo 2A</b>           | <b>grupo B</b>             | <b>grupo II</b>                    | probable agente cancerígeno para los seres humanos                                                                                        |
|                           | <b>B1</b>                  |                                    | evidencia disponible limitada para los seres humanos                                                                                      |
|                           | <b>B2</b>                  |                                    | evidencia inadecuada para los seres humanos, evidencia suficiente en animales                                                             |
| <b>grupo 2B</b>           | <b>grupo C</b>             | <b>grupo III</b>                   | posible agente cancerígeno para los seres humanos                                                                                         |
| <b>grupo 3</b>            | <b>grupo D</b>             | <b>grupo IV</b>                    | no clasificable como agente cancerígeno para los seres humanos / es poco probable que sea un agente cancerígeno (sólo para Health Canada) |
| <b>grupo 4</b>            | <b>grupo E</b>             | <b>grupo V</b>                     | agente probablemente no cancerígeno para los seres humanos                                                                                |
|                           |                            | <b>grupo VI</b>                    | no clasificable como agente cancerígeno para los seres humanos                                                                            |

<sup>(a)</sup> Agencia internacional para la investigación del cáncer (IARC 2008).

<sup>(b)</sup> USEPA – Sistema integrado de información de riesgos (IRIS) visitado en línea (USEPA 2009a).

<sup>(c)</sup> Health Canada (1996).

En la Tabla 2 se muestra las clasificaciones de carcinogenicidad para los CIP evaluados en la presente evaluación de riesgos.

**Tabla 2 Clasificación de Carcinogenicidad para los CIP en la Mina**

| Compuesto      | IARC                                                            | USEPA                                                                 | Health Canada                                   | ¿Evaluado como Agente Cancerígeno? |
|----------------|-----------------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------|------------------------------------|
| <b>Metales</b> |                                                                 |                                                                       |                                                 |                                    |
| aluminio       | ND                                                              | ND                                                                    | ND                                              | no                                 |
| arsénico       | grupo 1                                                         | grupo A                                                               | grupo 1                                         | si                                 |
| bario          | ND                                                              | grupo D                                                               | ND                                              | no                                 |
| cadmio         | grupo I                                                         | grupo B1 (solo por inhalación)                                        | grupo II                                        | si<br>(solo por inhalación)        |
| cromo          | grupo I (Cr VI);<br>Grupo 3<br>(metálicos)                      | grupo A (inhalación,<br>Cr VI)                                        | grupo I (Cr VI)                                 | si<br>(inhalación, Cr VI)          |
| cobalto        | grupo 2B                                                        | ND                                                                    | ND                                              | no                                 |
| cobre          | ND                                                              | ND                                                                    | ND                                              | no                                 |
| hierro         | ND                                                              | ND                                                                    | ND                                              | no                                 |
| plomo          | grupo 2B                                                        | grupo B2                                                              | grupo IIIB                                      | no                                 |
| manganeso      | ND                                                              | grupo D                                                               | ND                                              | no                                 |
| mercurio       | grupo 3                                                         | grupo D<br>(metálico)/C (cloruro<br>mercúrico)                        | ND                                              | no                                 |
| molibdeno      | ND                                                              | ND                                                                    | ND                                              | no                                 |
| níquel         | grupo 2B<br>(metálico)/<br>Grupo I<br>(compuestos de<br>níquel) | grupo A (polvo de<br>fundición)/<br>Grupo B2 (carbonilo<br>de níquel) | grupo IV<br>(metálico)/<br>Grupo I<br>(soluble) | si (níquel soluble)                |
| selenio        | ND                                                              | grupo D                                                               | ND                                              | no                                 |
| vanadio        | grupo 2B<br>(Pentóxido de<br>vanadio)                           | ND                                                                    | ND                                              | no                                 |
| zinc           | ND                                                              | grupo D                                                               | ND                                              | no                                 |

Fuente: IARC 2008, USEPA 2009, Health Canada 1996.

Nota: ND = no determinado.

En la Sección 1.5 se consolidan los perfiles de toxicidad para todos los contaminantes de interés potencial, la farmacocinética de definición, la toxicidad, la clasificación de carcinogenicidad y los valores referenciales basados en la toxicidad, seleccionados con el fin de utilizarse en la evaluación de los riesgos para la salud humana. En la Tabla 3

se presenta un resumen de los valores referenciales de toxicidad seleccionados para la evaluación de riesgos.

Tabla 3 VRT Seleccionados para la Evaluación de los Riesgos para la Salud Humana

| CIP                   | Clasificación                |                      | Valores Referenciales de Toxicidad |     |                                                                             |                  |                                   |     |                    |                       |                 |                                                                             |                  |
|-----------------------|------------------------------|----------------------|------------------------------------|-----|-----------------------------------------------------------------------------|------------------|-----------------------------------|-----|--------------------|-----------------------|-----------------|-----------------------------------------------------------------------------|------------------|
|                       | Health Canada <sup>(a)</sup> | USEPA <sup>(a)</sup> | Oral                               |     |                                                                             |                  | Dérmica                           |     |                    | Inhalación            |                 |                                                                             |                  |
|                       |                              |                      | IDT/DR <sub>o</sub>                | SF  | Efecto en el/los Órgano(s) Objetivo(s)                                      | Fuente           | DR <sup>(c)</sup>                 | FP  | FAR <sup>(f)</sup> | CR                    | Riesgo Unitario | Efecto en el/los Órgano(s) Objetivo(s)                                      | Fuente           |
| Metales Totales       |                              |                      |                                    |     |                                                                             |                  |                                   |     |                    |                       |                 |                                                                             |                  |
| aluminio              | ND                           | D                    | 1.0                                | N/A | sistema nervioso                                                            | EPA PPRTV        | 1                                 | N/A | 0.1                | 0.005                 | N/A             | sistema nervioso                                                            | EPA PPRTV        |
| arsénico              | I                            | A                    | 0.0003                             | 1.5 | piel                                                                        | USEPA IRIS       | 0.0003                            | 1.5 | 0.03               | N/A                   | 1.5             | pulmón                                                                      | OMS              |
| bario                 | ND                           | D                    | 0.2                                | N/A | riñones                                                                     | USEPA IRIS       | 0.2                               | N/A | 0.1                | 0.0005                | N/A             | fetotoxicidad                                                               | HEAST            |
| cadmio                | II                           | B1 (inhalación)      | 0.001 (alimentos)                  | N/A | proteinuria                                                                 | USEPA IRIS       | 0.001                             | N/A | 0.01               | N/A                   | 1.8             | pulmón                                                                      | USEPA IRIS       |
| cromo                 | I (CrVI)                     | A (inhalación, CrVI) | 0.003 (CrVI)                       | N/A | N/A                                                                         | USEPA IRIS       | 0.003                             | N/A | 0.1                | 0.0001 <sup>(h)</sup> | 40              | pulmón                                                                      | US EPA IRIS/ OMS |
| cobalto               | ND                           | ND                   | 0.0003                             | N/A | pulmón                                                                      | EPA PPRTV        | 0.0003                            | N/A | 0.01               | 0.000006              | N/A             | N/A                                                                         | EPA PPRTV        |
| cobre                 | ND                           | ND                   | 0.09 (niño pequeño)/ 0.1 (adulto)  | N/A | N/A                                                                         | HC 2009          | 0.09 (niño pequeño)/ 0.1 (adulto) | N/A | 0.06               | 0.001                 | N/A             | N/A                                                                         | RIVM, 2001       |
| hierro                | NC                           | NC                   | 0.7                                | N/A | N/A                                                                         | USEPA NCEA, 2001 | 0.7                               | N/A | 0.1                | N/A                   | N/A             | N/A                                                                         | N/A              |
| plomo                 | IIIB                         | B2                   | 0.0036                             | N/A | aumento significativo de las concentraciones de Pb en la sangre de infantes | HC 2009          | 0.0036                            | N/A | 0.006              | N/A                   | N/A             | aumento significativo de las concentraciones de Pb en la sangre de infantes | HC 2009          |
| manganeso             | NC                           | D                    | 0.06                               | N/A | basado en el NOAEL                                                          | OMS              | 0.06                              | N/A | 0.1                | 0.00005               | N/A             | sistema nervioso                                                            | USEPA IRIS       |
| mercurio              | ND                           | D                    | 0.002                              | N/A | riñones                                                                     | OMS              | 0.002                             | N/A | 0.1                | 0.0003                | N/A             | sistema nervioso                                                            | US EPA IRIS      |
| molibdeno             | ND                           | ND                   | 0.005                              | N/A | riñones                                                                     | USEPA IRIS       | 0.005                             | N/A | 0.01               | 0.012                 | N/A             | peso corporal                                                               | RIVM, 2001       |
| Níquel <sup>(d)</sup> | VI/I <sup>(b)</sup>          | A/B1 <sup>(g)</sup>  | 0.012                              | N/A | provocación oral en pacientes en ayunas                                     | OMS              | 0.012                             | N/A | 0.2                | 0.000018              | 0.38            | pulmón                                                                      | HC/OMS           |
| selenio               | ND                           | D                    | 0.005                              | N/A | selenosis clínica                                                           | USEPA IRIS       | 0.005                             | N/A | 0.01               | N/A                   | N/A             | N/A                                                                         | N/A              |



Tabla 1-3 VRT Seleccionados para la Evaluación de los Riesgos para la Salud Humana (continuación)

| CIP     | Clasificación                   |                      | Valores Referenciales de Toxicidad |     |                                            |                                 |                   |     |                    |            |                    |                                            |        |
|---------|---------------------------------|----------------------|------------------------------------|-----|--------------------------------------------|---------------------------------|-------------------|-----|--------------------|------------|--------------------|--------------------------------------------|--------|
|         | Health<br>Canada <sup>(a)</sup> | USEPA <sup>(a)</sup> | Oral                               |     |                                            |                                 | Dérmica           |     |                    | Inhalación |                    |                                            |        |
|         |                                 |                      | IDT/DR <sub>o</sub>                | SF  | Efecto en el/llos<br>Órgano(s) Objetivo(s) | Fuente                          | DR <sup>(c)</sup> | FP  | FAR <sup>(f)</sup> | CR         | Riesgo<br>Unitario | Efecto en el/llos<br>Órgano(s) Objetivo(s) | Fuente |
| vanadio | ND                              | ND                   | 0.00504                            | N/A | efectos sistémicos                         | USEPA<br>IRIS/<br>tablas<br>MPR | 0.00504           | N/A | 0.1                | N/A        | N/A                | N/A                                        | N/A    |
| zinc    | ND                              | D                    | 0.3                                | N/A | sangre                                     | USEPA<br>IRIS                   | 0.3               | N/A | 0.1                | N/A        | N/A                | N/A                                        | N/A    |

- (a) Las clasificaciones de *Health Canada* se obtienen de *Health Canada* 2008<sup>a</sup>, las clasificaciones USEPA se obtienen de USEPA IRIS (2009a).
- (b) El níquel metálico se clasifica en el grupo VI, el óxido de níquel, níquel soluble y sulfuro de níquel se clasifican en el grupo I.
- (c) VRT oral adoptado como VRT dérmico no disponible.
- (d) Níquel soluble utilizado para evaluar los efectos no cancerígenos (IDT mayoritariamente conservadoras), polvo de fundición de níquel utilizado con el fin de evaluar los efectos cancerígenos para la trayectoria de inhalación (es decir factor de pendiente).
- (e) DR para el vanadio basada en USEPA IRIS, DR para el pentóxido de vanadio con un ajuste del peso molecular (USEPA 2009c).
- (f) Factores de absorción dérmica relativa (FAR) se obtienen de *Health Canada* (2009).
- (g) USEPA IRIS clasifica al subsulfuro de níquel y al polvo de fundiciones de níquel en el grupo A y al carbonilo de níquel en el grupo B2. Las sales solubles de níquel como compuesto no se han clasificado.
- (h) CR por inhalación para particulados.

Notas: FP – factor de pendiente; DR – dosis referencial; CR – concentración referencial; FAR – factor de absorción relativa; HC - *Health Canada*; CCME – Consejo Canadiense de Ministros de Medio Ambiente; USEPA – Agencia para la protección de medio ambiente de los Estados Unidos; IRIS – Sistema Integrado de Información de Riegos; RAIS – Sistema de Información para la Evaluación de Riesgos (2009); OMS – Organización Mundial de la Salud; Tablas MPR – metas preliminares de remediación para la Región 9 de USEPA; valores de toxicidad provisionales revisados por expertos – EPA PPRTV; Centro Nacional para la Evaluación del Medio Ambiente – USEPA NCEA; DR se expresa en mg/kg-d; FP se expresa en (mg/kg-d)<sup>-1</sup>; CR se expresa en mg/m<sup>3</sup>; los riesgos unitarios se expresan en (mg/m<sup>3</sup>)<sup>-1</sup>; N/A = no aplicable.

## 1.4 EXPLORACIÓN DE LOS VALORES DE TOXICIDAD POR RUTA

La toxicidad de una sustancia se puede diferenciar por las rutas de exposición (por ejemplo oral frente a inhalación) y en consecuencia no se realizó una exploración de los CIP por ruta en ausencia de valores referenciales específicos para la inhalación (USEPA 2009b). Los valores de la DR por vía oral y los factores de la pendiente se utilizaron en forma conservadora con el fin de evaluar la exposición dérmica.

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## 1.6 PERFILES DE TOXICIDAD

### *Aluminio*

#### **Farmacocinética**

En general la absorción del aluminio en seres humanos y animales es baja mediante vías de exposición oral e inhalación, la absorción dérmica es incluso menos significativa (ATSDR 2008).

#### Exposición Oral

Se estima que la absorción del aluminio a través de ingestas alimenticias normales es de 0.1% y se puede absorber en mayor cantidad si se trata de formas más biodisponibles (por ejemplo complejos con algunos ácidos carboxílicos) con una tasa más cercana al 1.0%. Las condiciones acuosas y el pH de los intestinos afectan la absorción (ATSDR 2008). Se ha demostrado que la distribución del aluminio después de una exposición oral en animales ocurre en el cerebro (hipocampo), también se ha encontrado que la ingesta concomitante de vitamina D mejora la acumulación y la retención de aluminio en los huesos, riñones, músculos y corazón (ATSDR 2008). La eliminación de aluminio después de la absorción oral en seres humanos y animales ocurre en los riñones (a través de la orina) y el no absorbido se excreta principalmente a través de las heces. En un estudio con ratas se encontró que una dosis oral única de 11 mg aumenta 14 veces los niveles de aluminio en la orina dentro de las siguientes 24 horas posteriores a la exposición y que los niveles vuelven a la normalidad después de 5 días (ATSDR 2008).

#### Exposición por Inhalación

Los estudios sobre exposición por inhalación realizados en seres humanos descubrieron que la exposición ocupacional a vapores de aluminio, polvo y escamillas aumenta los niveles séricos y que la absorción directa en el cerebro pudiera ocurrir a través del tracto olfativo mediante el transporte axónico. En los resultados arrojados por la autopsia realizada a un picapedrero expuesto a aluminio se encontraron concentraciones elevadas (en comparación con los niveles normales) en los pulmones, ganglios linfáticos hilares, hígado y bazo (ATSDR 2008). Las ratas y los conejillos de indias con exposición intermedia o crónica al clorhidrato de aluminio mostraron acumulación principalmente en los pulmones y cierta acumulación adicional en las glándulas suprarrenales y los ganglios linfáticos peribronquiales. La excreción en seres humanos ocurre a través de la orina y existe una correlación entre la duración de la exposición y las concentraciones urinarias. Los soldados expuestos de 0.2 a 5.3 mg/m<sup>3</sup> de aluminio durante un período de 10 años presentaron vidas medias de aluminio urinario de más de 6 meses en comparación con los 9 días registrados en personas con una exposición de menos de 1 año (ATSDR 2008).

### Exposición Dérmica

Se realizó un estudio aplicando clorhidrato de aluminio en las axilas de dos individuos, en las conclusiones se establece que un 0.012% del aluminio aplicado se absorbió a través de la piel (ATSDR 2008). Otro estudio realizado esta vez con ratones reportó concentraciones elevadas en el hígado, cerebro, pulmones y riñones, después de una exposición de 0.04 mg/día durante 20 días de gestación (ATSDR 2008). No se encontraron estudios sobre la excreción del aluminio después de la exposición dérmica en seres humanos o animales (ATSDR 2008).

## **Toxicidad**

### Efectos no Cancerígenos

Los estudios sobre la toxicidad del aluminio mediante exposición por inhalación, oral o dérmica son limitados y con frecuencia contradictorios o aportan información limitada (es decir no especifican la dosis, la forma o la biodisponibilidad del aluminio o la identidad y la concentración de otros compuestos con exposición concomitante), haciendo así difíciles las evaluaciones de la toxicidad específica del aluminio.

### Exposición Oral

El aluminio está presente en toda la dieta de los seres humanos y los animales, y se utiliza en los aditivos alimenticios, los envases, el agua potable y las medicinas. Se estima que la ingesta alimenticia normal de los seres humanos es de 0.10 a 0.12 mg/kg/día en adultos (ATSDR 2008). Se reportó que la exposición oral al fosforo de aluminio es tóxica para los seres humanos (incluyendo los efectos cardiovasculares y gastrointestinales después de una exposición accidental aguda o por un intento de suicidio), aunque se considera el resultado de la formación de gas fosfina altamente tóxico y no del aluminio en sí. Se realizó diversos estudios sobre toxicidad oral en animales, desafortunadamente la tasa base de la ingesta alimenticia con frecuencia no se informa, lo que subvalora las concentraciones totales de la ingesta. Algunos efectos del aluminio después de una ingesta oral en roedores incluyen ataxia, expansión y arrastre de las extremidades posteriores y parálisis de ratones madre expuestos a aproximadamente 184 mg/kg/día o 250 mg/kg/día en forma de lactato de aluminio durante la gestación y la lactancia (ATSDR 2008).

Estudios sobre la absorción oral del aluminio encontraron NOAEL variando entre los 0.6 mg/kg/día en ratones hembra y todas las ratas, después de 5 o 7 semanas (ratones) y una exposición de 2.5 años (ratas) al cloruro de aluminio y sulfato de aluminio y potasio (administrados en la comida y el agua), y los 979 mg/kg/día en ratones (administrados en la ingesta alimenticia en forma de sulfato de aluminio y potasio durante 20 meses) (ATSDR 1999). Los NOAEL por exposición oral fluctuaron entre los 130 mg/kg/día (administrados en forma de lactato de aluminio en la ingesta alimenticia durante un periodo de 6 semanas) en ratas (causando disminución de la

actividad neurológica total, vertical y horizontal; disminución del periodo diurno y acortamiento de los periodos de actividad) y los 770 mg/kg/día (administración una sola vez a través de sonda en forma de cloruro de aluminio) en ratones machos (correspondientes a una  $DL_{50}$ ) (ATSDR 2008).

### Exposición por Inhalación

Estudios ocupacionales revelaron toxicidad después de una exposición por inhalación, incluyendo respiración sibilante, disnea y daños a la función pulmonar (después de la exposición a vapores de aluminio no especificados) y fibrosis pulmonar después de la exposición a polvos contendores de aluminio. Las exposiciones ocurrieron en forma simultánea con exposición a muchos otros químicos tóxicos (ATSDR 2008). Una persona expuesta en forma crónica al polvo de aluminio y al aluminio metálico mostró efectos reversibles en los pulmones (granulomas epitelioides tipo sarcoidosis). Los efectos neurológicos en trabajadores expuestos en forma crónica se limitan a efectos sub-clínicos que incluyen daños a la memoria, cambios en el electroencefalograma (EEG), coordinación vista-mano y destrezas motoras; aunque en los estudios no se caracterizó adecuadamente la exposición al aluminio y su validez se cuestiona (ATSDR 2008). En estudios con hámsters encontró aumentos en el peso absoluto de los pulmones después de una exposición de 3 días a  $\geq 7 \text{ mg/m}^3$  y se corresponden a hallazgos similares realizados en conejos después de exposiciones a  $43 \text{ mg/m}^3$  durante 5 días. En otro estudio con duración de 24 meses, se observó una reducción en el peso corporal en ratas expuestas a  $6.1 \text{ mg/m}^3$  de clorhidrato de aluminio.

Estudios sobre absorción por inhalación con animales de laboratorio encontraron NOAEL para el aluminio fluctuando entre los  $0.061 \text{ mg/m}^3$  después de una exposición por largo tiempo al clorhidrato de aluminio en ratas y conejillos de indias y los  $100 \text{ mg/m}^3$  después de una exposición durante 5 días al polvo de aluminio, durante 4 horas/día en ratas (ATSDR 2008). Los LOAEL por inhalación oscilaron entre los  $0.61 \text{ mg/m}^3$  en ratas y conejillos de indias debido a la exposición al clorhidrato de aluminio durante 6 meses, 5 días/semana, 6 horas/día (causando incrementos de macrófagos alveolares y lesiones en los pulmones en ambas especies) y los  $200 \text{ mg/m}^3$  en ratones después de una exposición de 5 días al polvo de aluminio (causando microgranulomas multifocales en los pulmones) (ATSDR 2008).

### Exposición Dérmica

Los estudios sobre la exposición dérmica son limitados, sin embargo los efectos de la exposición al aluminio incluyen daños a la piel en ratones hembra, conejos y conejillos de indias grandes después de aplicar 10% de cloruro de aluminio (0.005 a 0.1 g Al) o nitrato de aluminio (0.006 a 0.013 g Al), aunque en ninguna otra forma después de un estudio de exposición de 5 días (ATSDR 2008). Estudios sobre el aumento de incidencias de la enfermedad de Alzheimer después de la aplicación de desodorantes

contentivos aluminio en seres humanos establecen una tendencia ( $p=0.03$ ) a un mayor riesgo con el aumento de uso de estos desodorantes (ATSDR 2008).

#### Dosis Referencial para la Exposición Oral Crónica (DR)

*Health Canada* (2009) no ha desarrollado una ingesta diaria tolerable para el aluminio (*Health Canada* 2009).

USEPA derivó una DR provisional correspondiente a 1 mg/kg/día para el aluminio (USEPA 2009b). El USEPA IRIS no dispone de una DR para el aluminio (2009a).

#### Concentración Referencial para la Exposición por Inhalación Crónica (CR)

*Health Canada* (2009) no ha desarrollado una concentración tolerable para el aluminio.

El USEPA IRIS no dispone de una CR para el aluminio, sin embargo existe una establecida en el RAIS (2009). La concentración referencial para inhalación crónica corresponde a  $5.00\text{E-}03 \text{ mg/m}^3$ . La CR se basa en un estudio realizado por Hosovski (1990), donde se evaluó los efectos críticos del aluminio en el deterioro psicomotriz y cognitivo de los seres humanos. La CR posee un factor de modificación de 1 y un factor de incertidumbre de 300 y la confianza general se considera de baja a media. La CR convertida en una dosis referencial para inhalación crónica corresponde a  $1.43 \text{ E-}03 \text{ mg/kg/día}$ .

#### Efectos Cancerígenos

*Health Canada* (2009) y USEPA (2009a) no han evaluado la carcinogenicidad del aluminio.

#### Riesgo de Desarrollar Cáncer por Exposición Oral

Actualmente no se dispone de un factor de pendiente oral para el aluminio (*Health Canada*, 2009 y USEPA, 2009a).

#### Riesgo de Desarrollar Cáncer por Exposición a la Inhalación

Actualmente no se dispone de un factor de pendiente oral para el aluminio (*Health Canada*, 2009 y USEPA, 2009a).

#### **Resumen**

|                                      |                                   |             |
|--------------------------------------|-----------------------------------|-------------|
| DR <sub>o</sub> por vía oral crónica | 1 mg/kg/día                       | USEPA 2009b |
| CR por inhalación                    | $5.0\text{E-}3 \text{ mg/kg/día}$ | RAIS 2009   |

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|                                   |               |                      |
|-----------------------------------|---------------|----------------------|
| Factor de pendiente oral          | no disponible | HC 2009, USEPA 2009a |
| Factor de pendiente de inhalación | no disponible | HC 2009, USEPA 2009a |

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## **Arsénico**

### **Farmacocinética**

#### Exposición Oral

Los estudios en seres humanos muestran que tanto los arseniatos como los arsenitos se absorben en gran cantidad a través del tracto gastrointestinal; la evidencia se encuentra en el pequeño porcentaje de arsénico eliminado directamente en las heces (la absorción de sales de arsénico insoluble después de una exposición oral es mucho menor que la absorción de los arseniatos y arsenitos). Se estima que la absorción de arseniatos y arsenitos a través del tracto gastrointestinal es del orden del 95% y la excreción urinaria varía entre el 55 y el 80% de la tasa de ingesta diaria. Estudios sobre la biodisponibilidad del arsénico realizados en animales indican que la absorción del arsénico ingerido en polvo o del suelo es considerablemente menor que la absorción del arsénico a partir de sales ingeridas (ATSDR 2000). La biodisponibilidad del arsénico a partir del suelo se reduce por la baja solubilidad y accesibilidad debido a la presencia de otros componentes de la matriz del suelo (Davis 1992 según se cita en ATSDR 2000). En un estudio en el que se incubó suelo contaminado con arsénico proveniente de minas y fundiciones en ácido estomacal simulado se encontró que sólo una porción del arsénico (entre 3% a 50%) se solubilizó. El arsénico soluble o biodisponible estimado coincide en gran forma con la biodisponibilidad estimada para las mismas muestras de suelo.

#### Exposición por Inhalación

El arsénico inhalado por transmisión aérea se deposita rápidamente en el tracto respiratorio y se absorbe en el flujo sanguíneo (Hrudey 1996) y el tamaño y la solubilidad de los aerosoles que contienen arsénico influyen en la extensión del depósito, la retención y la depuración de los pulmones. Un estudio sobre la absorción del arsénico en un grupo de pacientes con cáncer pulmonar indicó que aproximadamente el 40% del arsénico contenido en el humo de los cigarrillos se depositó en los pulmones, calculándose la absorción entre 75 a 85%, originando una absorción total de aproximadamente 30 a 40% del arsénico contenido en dicho humo. La Conferencia de Higienistas Industriales del Gobierno de los Estados Unidos (ACGIH 2001) indica que aproximadamente el 77% de las partículas transportadas por el aire con un diámetro de 10  $\mu\text{m}$  se deposita generalmente en el tracto respiratorio. La Organización Mundial de la Salud (OMS 1981, según se cita en ATSDR 2000) indica que la biodisponibilidad del As (III) soluble al agua depositado podría ser hasta de 85 a 90%. Los trabajadores de fundiciones expuestos a trióxido de arsénico absorbieron aproximadamente entre 40 y 60% de la dosis inhalada estimada (Vahter 1986, según se cita en ATSDR 2000). Vahter también demostró que la eliminación de arsénico a través de la orina es relativamente rápida, ya que la excreción aumentó en pocas horas posteriores a que los trabajadores comenzaron el trabajo de la semana y disminuyó durante el fin de semana.

### Exposición Dérmica

Se han realizado diversos estudios sobre la absorción del arsénico inorgánico a través de la piel en seres humanos y animales. Wester (1993, según se cita en Hrudey 1996) estudió la absorción del arsénico del agua y el suelo tanto en seres humanos como en monos. Se realizó pruebas de la absorción del arsénico y de arsénico mezclado con suelo a través de la piel utilizando arsénico marcado radioactivamente ( $H_3AsO_4$ ) en cadáveres y se encontró que únicamente el 0.8% del arsénico en la solución de agua penetra la piel de los seres humanos en comparación con el 2 a 6% que penetró la piel abdominal de los monos; entre 3% y 4.5% del arsénico mezclado con suelo se absorbió por la piel de los monos mientras que el 1.9% por la piel humana.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

Se reportaron efectos respiratorios como edemas pulmonares, dificultad respiratoria y bronquitis hemorrágica después de casos de envenenamiento agudo con arsénico por vía oral, originados por el consumo de dosis de 8 mg/kg. Los efectos se pudieran considerar como secundarios originados por el daño al sistema cardiovascular. Se estableció que altas dosis orales de arsénico causan arritmias cardíacas.

La enfermedad del pie negro (pérdida de la circulación en los dedos de las manos y de los pies) es el principal efecto de la exposición crónica al arsénico en el sistema cardiovascular y se demostró en una zona de Taiwán con altos niveles de arsénico en el agua potable. También se observan casos similares aunque menos graves, de enfermedades vasculares periféricas como la enfermedad de Raynaud y la gangrena de dedos de las manos y de los pies en poblaciones expuestas en forma crónica a concentraciones elevadas de arsénico en el agua potable en Bangladesh, México y Chile (ATSDR 2000). La neuropatía periférica, caracterizada por el entumecimiento de manos y pies, corresponde al efecto colateral neurológico más común producto de la exposición crónica al arsénico por vía oral. Los síntomas mejoran una vez que la exposición se detiene pero la recuperación tiende a ser lenta e incompleta (ATSDR 2000).

El consumo oral de arsénico inorgánico ocasiona malestar gastrointestinal y los síntomas usualmente incluyen náuseas, vómitos y diarrea (ATSDR 2000). Los síntomas resultan de la irritación de la mucosa gastrointestinal y disminuyen varios días después de la exposición. Con frecuencia se observa en seres humanos expuestos oralmente al arsénico, la depresión de los glóbulos rojos (anemia) o de los glóbulos blancos (leucopenia) (ATSDR 2000). Se observó daños a las células hepáticas únicamente en algunos casos de envenenamiento agudo con arsénico y usualmente no se asocian con la exposición crónica de bajo nivel al arsénico por vía oral. Las lesiones

cutáneas como hiperqueratinización de la piel en las palmas de las manos y las plantas de los pies, formación de callos y verrugas y la hiperpigmentación o hipopigmentación de la piel son los primeros signos clínicos (ATSDR 2000).

Existe evidencia donde se sugiere que el arsénico pudiera causar efectos en el desarrollo, se reportó el caso de una madre con ingesta de arsénico en la semana 30 de su embarazo, originando el nacimiento de su bebé prematuro quien murió varios días después al presentar hemorragia pulmonar grave, análisis posteriores revelaron altos niveles de arsénico en el hígado, los riñones y el cerebro del bebé (Lugo 1969 en ATSDR 2000). Estudios más recientes donde se evalúa los niveles normales de arsénico en el agua potable, los defectos cardíacos congénitos y los abortos espontáneos, no arrojan resultados concluyentes debido a los reducidos tamaños de la muestra y a la presencia de múltiples contaminantes (ATSDR 2000). La exposición a los polvos de arsénico en el lugar de trabajo originó casos de dermatitis por contacto y si el contacto ocurre de manera repetida pudiera generar sensibilización al arsénico en entornos ocupacionales.

Los estudios no identifican sub-poblaciones de seres humanos con susceptibilidad particular al arsénico. Sin embargo es posible que las personas con menos capacidad de generar la metilación del arsénico en el hígado, mecanismo por el cual la toxicidad del arsénico se reduce, pudieran ser más susceptibles (ATSDR 2000). La menor capacidad del hígado de generar la metilación del arsénico se podría deber a la falta de colina o metionina en la dieta y la menor capacidad de metilación del hígado no parece ser el resultado de una enfermedad hepática, al menos no con niveles bajos de exposición al arsénico (ATSDR 2000).

#### Exposición por Inhalación

La mayor parte de la información sobre la exposición por inhalación de arsénico en seres humanos se deriva de entornos ocupacionales tales como fundiciones y plantas químicas en donde la forma predominante del arsénico transportado por el aire es el polvo de trióxido de arsénico. Los trabajadores expuestos a polvos de arsénico en el aire experimentaron irritación de las membranas mucosas de la nariz y la garganta que podrían originar laringitis, bronquitis o rinitis; existe cierta evidencia de que el arsénico inorgánico inhalado también podría tener efectos cardiovasculares. Estudios con mortalidad de la cohorte realizados a trabajadores expuestos al arsénico en varias fundiciones reportaron sobre el aumento del riesgo de mortalidad a partir de enfermedades cardiovasculares (es decir cardiopatía isquémica y enfermedad cerebrovascular) y efectos neurológicos periféricos. Sin embargo diversos factores (exposición al cobre y a otros metales) pudieran alterar las conclusiones. Varios estudios reportan la presencia de náuseas, vómitos y diarreas en trabajadores con envenenamiento agudo por arsénico después de la exposición por inhalación en el lugar de trabajo. Se observó dermatitis (hiperpigmentación, foliculitis y ulceraciones

superficiales) en 11 empleados de un departamento de una fundición de estaño en Malasia (de un total de 500 empleados en la planta) expuestos a concentraciones promedio de óxido de arsénico de 0.005 a 0.014 mg As<sub>2</sub>O<sub>3</sub>/m<sup>3</sup>. También existen varios estudios que sugieren que la exposición por inhalación al arsénico podría causar un aumento de las incidencias de abortos espontáneos, aumentos significativos en las incidencias de malformaciones congénitas y una reducción significativa del peso promedio de nacimiento en empleadas de fundiciones en Suecia (ATSDR 2000).

No se encontraron estudios sobre los efectos respiratorios en seres humanos expuestos a arsénicos orgánicos. La exposición de ratas y ratones a altas concentraciones de arsénico por corto tiempo causó dificultad respiratoria y la necropsia de animales reveló pulmones de color rojo brillante con manchas oscuras, también se observó dificultad respiratoria en ratas y ratones expuestos a altos niveles de arsénico.

#### Exposición Dérmica

Diversos estudios con seres humanos expuestos a polvos de arsénico en su lugar de trabajo reportaron que el arsénico inorgánico (usualmente trióxido de arsénico) puede causar dermatitis por contacto (eritema e hinchazón, con pápulas y vesículas). También se reportó que la aplicación de arsénico orgánico en la piel de conejos origina una leve irritación dérmica.

#### Ingesta Diaria Tolerable (IDT) y Dosis Referencial (DR) para la Exposición Crónica Oral

Actualmente no se dispone de un valor para la ingesta diaria tolerable del arsénico y sus compuestos inorgánicos por parte de *Health Canada* (*Health Canada* 2004).

Se observó un aumento en lesiones cutáneas y enfermedades vasculares tales como la enfermedad del pie negro en personas que consumieron agua con elevados niveles de arsénico por largos periodos de tiempo. Sobre la base de esta población se determinó un NOAEL de 0.009 mg/L (o 8E-4 mg/kg/día) y un LOAEL de 0.17 mg/L de arsénico (~0.014 mg/kg/día) (USEPA 2004). USEPA desarrolló una dosis referencial oral de 3E-4 mg/kg/día dividiendo el NOAEL por un factor de seguridad de 3 con el fin de representar los pocos datos existentes sobre los posibles efectos del arsénico en la toxicidad reproductiva (USEPA 2004).

#### Concentración Tolerable (CT) y Concentración Referencial (CR) para la Exposición Crónica por Inhalación

Actualmente no se dispone de un valor para la concentración tolerable de arsénico y sus compuestos inorgánicos por parte de *Health Canada* (*Health Canada* 2004).

Actualmente no se dispone de una concentración referencial para la exposición crónica por inhalación de arsénico (USEPA 2004).

### Efectos Cancerígenos

*Health Canada* clasificó al arsénico y sus compuestos inorgánicos en el grupo I, es decir cancerígenos para los seres humanos, según la carcinogenicidad documentada posterior a la exposición oral y por inhalación (*Health Canada* 1993). Los cánceres humanos asociados con la exposición ocupacional a los compuestos de arsénico incluyen el cáncer de pulmón, estómago, colón, hígado y sistema urinario; correspondiendo a la exposición por inhalación la trayectoria más significativa (*Health Canada* 1993). También se caracterizó la exposición oral y un estudio taiwanés encontró cánceres de piel asociados con la ingesta de arsénico en agua potable (*Health Canada* 1993).

USEPA clasificó el arsénico inorgánico en el grupo A, es decir agente cancerígeno conocido para los seres humanos por exposición oral e inhalación según el aumento de mortalidad producido por cáncer pulmonar en múltiples poblaciones humanas (expuestas principalmente a través de la inhalación), aumento de la mortalidad producido por cánceres en múltiples órganos internos (hígado, riñones, pulmones y vejiga) y aumento en la incidencia del cáncer de piel en poblaciones que consumen agua potable con altos niveles de arsénico inorgánico (USEPA 2004).

### Riesgo de Desarrollar Cáncer por Exposición oral

*Health Canada* derivó un factor de pendiente oral de  $2.8 \text{ (mg/kg/día)}^{-1}$  (*Health Canada* 2004) según el punto final crítico del cáncer de piel. Los datos utilizados para desarrollar el factor de pendiente oral se seleccionaron de la cohorte taiwanesa (Tseng 1968, Tseng 1977, según se cita en *Health Canada* 2004), expuesta hasta 1.82 ppm de arsénico en agua potable, el potencial de cáncer se estimó utilizando un modelo de múltiples fases con el fin de que la concentración correspondiente a un aumento en la prevalencia de cáncer de piel sea de 5%. *Health Canada* recientemente emitió un valor guía preliminar de  $1.8 \text{ (mg/kg/día)}^{-1}$  tomando como base la evaluación de la guía revisada de agua potable (*Health Canada* 2009).

USEPA desarrolló un factor de pendiente del cáncer de  $1.5 \text{ (mg/kg/día)}^{-1}$  para exposición oral, basado en estudios que indican un aumento en la incidencia del cáncer de piel en poblaciones taiwanesas expuestas por vía oral al arsénico en agua potable (Tseng 1968, Tseng, 1977 en USEPA 2004).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

*Health Canada* desarrolló un valor de concentración tumorigénica ( $TC_{05}$ ) para la exposición por inhalación al arsénico y sus compuestos inorgánicos de  $7.8E-3 \text{ } \mu\text{g}/\text{m}^3$

(*Health Canada* 1993, 2004), el valor se basa en un estudio ocupacional en la Fundición Anaconda en Montana el cual descubrió niveles elevados de cánceres pulmonares en empleados que inhalaron arsénico (*Health Canada* 1993). El tamaño del estudio se considera como suficiente para determinar una exposición estimada, sin embargo no se realizaron intentos para validar la exposición estimada por trabajador, sobre la base de una revisión de los registros originales (*Health Canada* 1993). En el año 2004 *Health Canada* convirtió la  $TC_{05}$  en un factor de pendiente de inhalación utilizando la ecuación  $(0.05/(TC_{05} \times 16m^3/día/70.7kg))$ , el factor de pendiente resultante corresponde a  $28.0 (mg/kg/día)^{-1}$ .

La Organización Mundial de la Salud (OMS) dedujo un riesgo unitario tomando como base estudios en poblaciones de seres humanos expuestos en Suecia y los Estados Unidos y su susceptibilidad al cáncer pulmonar. El riesgo se calculó de por vida en  $1.5 \times 10^{-3}$  con una concentración de aire de  $1 \mu g/m^3$ .

### Resumen

|                                |                        |                   |                    |
|--------------------------------|------------------------|-------------------|--------------------|
| ingesta diaria tolerables      | no disponible          |                   | Health Canada 2009 |
| DR crónica por vía oral        | $3E-4 mg/kg/día$       | lesiones cutáneas | USEPA 2006         |
| concentración tolerable        | no disponible          |                   | Health Canada 2009 |
| CR por inhalación              | no disponible          |                   | USEPA 2006         |
| factor de pendiente oral       | $1.8 (mg/kg/día)^{-1}$ | lesiones cutáneas | Health Canada 2009 |
| riesgo unitario por inhalación | $1.5 (mg/m^3)^{-1}$    | cáncer pulmonar   | OMS 2000           |

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## **Bario**

### **Farmacocinética**

#### **Exposición Oral**

Se considera que la exposición oral es la ruta principal de la exposición al bario en seres humanos (ATSDR 1992). Se considera también que la absorción de bario a través del tracto gastrointestinal es muy pobre, estimada en <5% (ATSDR 1992). Mediante experimentos con ratas se descubre que los animales más jóvenes (<22 días de nacidos) absorben aproximadamente 10 veces más cloruro de bario por el tracto gastrointestinal (63% a 84%) en comparación con los animales de más edad (aproximadamente 7%). En perros por ejemplo los niveles séricos de bario indican que la absorción máxima por el tracto gastrointestinal se realiza en el transcurso de 1 hora y la distribución del bario a través de la exposición oral es similar a la exposición por inhalación, con 93% de acumulación en huesos y dientes. El cuerpo no metaboliza el bario, aunque se pudiera transportar e incorporar a complejos metabólicos o tejidos corporales y debido a que se absorbe muy poco por los seres humanos, la mayor parte del bario administrado en forma oral se excreta en las heces, mientras que aproximadamente sólo el 3% se excreta en la orina.

### Exposición por Inhalación

No se establecen las características de la velocidad y extensión de la absorción del bario por inhalación en seres humanos. Sin embargo se han realizado estudios de laboratorio con animales, en hámsters el 65% del bario depositado en la región nasal en forma de cloruro de bario eventualmente se absorbe en el cuerpo (ATSDR 1992). Un estudio con perros encontró que aproximadamente el 50% del bario inhalado en forma de cloruro de bario y el 75% del bario inhalado en forma de sulfato de bario se deposita en la región pulmonar, aproximadamente el 25% se transporta al esqueleto y el resto se excreta en la orina y en las heces durante un periodo de 2 semanas. La vida media biológica del bario es de 8 días en perros y 10 días en ratas. Estudios sobre la distribución del bario a través de la exposición por inhalación en seres humanos determinaron que el bario se deposita principalmente en el esqueleto y los dientes. Los perros que inhalaban cloruro de bario radioactivo presentaron 70% de deposición en los pulmones y los órganos internos (44% en el esqueleto, 13% en la orina y 13% en las heces) con deposición poco significativa en la sangre (1%) y en los músculos (4%). No se encontraron estudios sobre la excreción del bario en seres humanos, pero <1% del cloruro de bario inhalado permanece en los perros después de 5 días.

### Exposición Dérmica

No se encontraron estudios con seres humanos sobre la absorción, distribución o excreción del bario a través de exposición dérmica. Estudios con animales mostraron que se encontró el bario aplicado en la piel de lechones en varias capas de la piel (ATSDR 1992). No se espera que el bario atravesase la piel intacta debido a la alta polaridad de las formas en las cuales se encuentra más comúnmente.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

La mayor parte de los estudios sobre la toxicidad del bario realizados con seres humanos se refieren a exposición oral y los efectos que siguen a una exposición aguda, incluyen debilidad para respirar y parálisis (requiere ventilación mecánica), hipertensión y arritmia cardíaca, malestar gastrointestinal, debilidad muscular progresiva originando parálisis total o parcial, degeneración de los riñones y fallo renal agudo, y en los casos más graves, muerte por paro cardíaco o hemorragia gastrointestinal. Estudios con animales de laboratorio descubrieron acumulación de fluido en la tráquea de ratas (después de una exposición aguda) y aumento de la presión sanguínea después de una exposición oral.



Estudios sobre absorción oral en ratas de laboratorio reportaron NOAEL para el cloruro de bario administrado en agua potable variando entre los 0.054 mg/kg/día (enfocándose en efectos cardiovasculares) y los 198 mg/kg/día en (la misma tasa no tuvo efectos en el sistema cardiovascular, hematológico o inmunológico) (ATSDR 1992). Los LOAEL de bario obtenidos a partir de estudios sobre la absorción oral de cloruro de bario oscilaron entre los 0.54 mg/kg/día en ratas (causando un aumento de la presión sanguínea) y los 277 mg/kg/día en ratas (causando la muerte en el 50% de los machos).

#### Exposición por Inhalación

Se demostró que la inhalación en seres humanos del polvo de sulfato de bario tiene efectos poco significativos en los pulmones (neumoconiosis benigna). En estudios con animales se encontró lesiones pulmonares en ratas después de una exposición intermedia a 3.6 mg/m<sup>3</sup> de polvo de carbonato de bario y broncoconstricción en conejillos de indias después de una exposición a 0.06 mg/m<sup>3</sup>/min de cloruro de bario en aerosol, durante un periodo no especificado (ATSDR 1992).

#### Exposición Dérmica

El polvo del óxido de bario se considera como un irritante dérmico (USEPA 1997). Se esperaría que las sales de bario tengan un efecto local en superficies cutáneas y sería poco probable que se absorban sistemáticamente en gran medida. Se dispone de informes sobre el caso de una persona expuesta al cloruro de bario fundido a través de la piel, sobre irritación cutánea que evalúa el carbonato de bario en animales de laboratorio y sobre un estudio que utilizó el pintado de la piel; en el cual se expuso la piel de ratones a un extracto de hojas del tabaco con hidróxido de bario (ATSDR 1992). Las quemaduras cutáneas desarrolladas en la persona expuesta al cloruro de bario fundido podrían haber contribuido posiblemente al electrocardiograma anormal, vómitos, reducción del potasio en plasma y aumento de los niveles de bario en plasma. Las ratas y los conejos expuestos al carbonato de bario en forma tópica mostraron signos de ulceraciones cutáneas.

#### Dosis Referencial para la Exposición Crónica Oral (DR)

La DR para el bario corresponde a 0.07 mg/kg/día tomando como base el NOAEL de 10 y 7.3 mg/L (ajustado a 0.21 mg/kg/día). Se enfocó en el peso de la evidencia para deducir la DR que a su vez utilizó un estudio experimental y uno epidemiológico con seres humanos y estudios crónicos y sub-crónicos con ratas. En ambos estudios con seres humanos no se encontró efectos en los adultos y en los estudios crónicos y sub-crónicos con ratas se encontró NOAEL de 65 y 45 mg/kg/día y LOAEL de 115 y 75 mg/kg/día para los efectos renales (aumento del peso de los riñones). Se aplicó un factor de incertidumbre total de 3, compuesto por un FI de 1 para representar algunas deficiencias de la base de datos y un factor de 3 para representar la falta de posibles

diferencias entre los adultos y los niños y de estudios adecuados sobre toxicidad en el desarrollo. Se reportó que la confianza en la DR oral para el bario es media debido a la calidad del estudio, la base de datos y el valor de la DR.

#### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

No se dispone de una CR por inhalación aunque los estudios realizados con animales y seres humanos sugieren que el sistema respiratorio es un blanco de la toxicidad para el bario (USEPA 2004). Se estableció una DR<sub>i</sub> a partir de una tabla HEAST alternativa con un valor de 5E-4 mg/kg/día (EPA Región 3 2009).

#### Efectos Cancerígenos

El bario se considera un agente cancerígeno de grupo D, es decir no clasificable como cancerígeno para los seres humanos. La clasificación se basa en la falta de estudios adecuados sobre inhalación, aunque todavía se considera como poco probable que el bario sea cancerígeno para los seres humanos después de una exposición oral (USEPA 2009).

#### Riesgos de Desarrollar Cáncer por Exposición Oral

No se dispone de un factor de pendiente oral para el bario.

#### Riesgos de desarrollar cáncer debido a una exposición por inhalación

No se dispone de un factor de pendiente de inhalación para el bario.

#### **Resumen**

|                                   |                  |                        |                      |
|-----------------------------------|------------------|------------------------|----------------------|
| DR oral crónica                   | 0.2 mg/kg/día    | efectos en los riñones | USEPA 2009           |
| CR por inhalación                 | no disponible    |                        | USEPA 2009           |
| DR <sub>i</sub> por inhalación    | 1.4E-4 mg/kg/día |                        | USEPA Región 3, 2009 |
| factor de pendiente oral          | no disponible    |                        | USEPA 2009           |
| factor de pendiente de inhalación | no disponible    |                        | USEPA 2009           |

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## **Cadmio**

### **Farmacocinética**

#### Exposición Oral y por Inhalación

El principal lugar de absorción del cadmio en los seres humanos después de una inhalación son los alvéolos de los pulmones, mientras que la mayor parte del cadmio ingerido tiende a pasar a través del tracto gastrointestinal sin absorberse y se excreta en las heces (ATSDR 1999). El cadmio absorbido en los pulmones y el tracto gastrointestinal tiende a excretarse muy lentamente y se encuentra en proporciones iguales en la orina y las heces (ATSDR 1999). Los dos principales órganos objetivo para el cadmio son los riñones y el hígado. La vida media del cadmio en el cuerpo humano es muy larga y se estima para los riñones entre 6 a 38 años y en el hígado entre 4 a 19 años (ATSDR 1999). La placenta podría actuar como una barrera parcial a la exposición de feto al cadmio (ATSDR 1999). El cadmio no se metaboliza y se fija a las proteínas y otras moléculas, en particular a la albúmina (una proteína) en el torrente sanguíneo y se transporta al hígado (ATSDR 1999), una vez que el cadmio ingresa al hígado se fija a otra proteína llamada metalotioneína y se libera nuevamente al torrente sanguíneo, posteriormente el cadmio fijado en la metalotioneína se filtra por los glomérulos de los riñones y se reabsorbe por las células del túbulo proximal. Las lisosimas (enzimas fuertes) degradan el complejo de cadmio-metalotioneína y permiten que el cadmio libre se libere en los riñones. El cadmio libre inicia la síntesis de la metalotioneína en las células de túbulo proximal y también puede causar daño excesivo a los riñones.

#### Exposición Dérmica

Actualmente no existe información para determinar la posible absorción del cadmio a través de la ruta de exposición dérmica (ATSDR 1999). Según la poca información existente al parecer se absorbe muy poco cadmio a través de la piel.

### **Toxicidad**

#### Efectos no Cancerígenos

##### Exposición Oral

Altas dosis agudas de cadmio por vía oral (0.07 mg/kg) pudieran causar efectos gastrointestinales como náuseas, vómitos y dolor abdominal (Nordberg 1973, según se cita en ATSDR 1999). La ingesta o inhalación de cadmio puede producir anemia y si se transporta a los intestinos, reducirá la absorción del hierro. Sin embargo en poblaciones con una ingesta alimenticia adecuada de hierro, es probable que la anemia inducida por el cadmio no sea un problema, ya que el aumento de la ingesta compensará la menor absorción (ATSDR 1999). La exposición crónica de cadmio en

conjunto con una mala nutrición puede originar cambios en la forma en que los riñones metabolizan la vitamina D, causando enfermedades óseas dolorosas tales como osteomalacia y osteoporosis (ATSDR 1999). El cadmio causa daños renales especialmente a los túbulos renales en las etapas iniciales y a medida que la enfermedad avanza o la dosis aumenta, también se observa daño glomerular (ATSDR 1999). Existen datos limitados que sugieren que las exposiciones al cadmio en mujeres embarazadas pudieran ocasionar una reducción del peso de sus bebés al nacer (ATSDR 1999). Las poblaciones que podrían ser inusualmente susceptibles a la exposición al cadmio son aquellas con una predisposición genética a una menor capacidad de inducción de la metalotioneína, la enzima que aísla el cadmio. El aumento de la absorción del cadmio mediante el tracto gastrointestinal podría originar que las personas presenten niveles reducidos de calcio y hierro a consecuencia de deficiencias en su dieta (ATSDR 1999). Los infantes y los niños pudieran presentar una reducción de la absorción del cadmio a través del tracto gastrointestinal y mayores concentraciones de cadmio en los huesos.

#### Exposición por Inhalación

La inhalación del cadmio a  $5 \text{ mg/m}^3$  ocasiona edemas pulmonares, traqueobronquitis y neumonitis en los seres humanos (ATSDR 1999).

#### Exposición Dérmica

El cadmio parece tener una toxicidad dérmica relativamente baja según los estudios ocupacionales en los cuales trabajadores que presentaron exposición a altos niveles de polvo de cadmio, no reportaron ningún efecto dérmico, y adicionalmente el cadmio no parece ocasionar sensibilización por el contacto dérmico repetido (ATSDR 1999).

#### Dosis Referencial para la Exposición Crónica Oral (DR)

USEPA desarrolló dosis referenciales orales para el cadmio en los alimentos y el agua y corresponde a  $1\text{E-}3 \text{ mg/kg/día}$  en el caso de los alimentos y  $5\text{E-}4 \text{ mg/kg/día}$  para el agua (USEPA 2004). Se determinó que el nivel más elevado de cadmio en los riñones humanos que no produce proteinuria es  $200 \text{ µg/g}$  de la corteza renal húmeda. Se utilizó un modelo toxicocinético con el fin de determinar el nivel de exposición oral crónica que podría causar una concentración de cadmio en los riñones de  $200 \text{ µg/g}$  de la corteza renal húmeda. El modelo supone que el 0.01% de la carga corporal de cadmio en los riñones se elimina diariamente y que la absorción de cadmio a partir de los alimentos y el agua es de 2.5 y 5%, respectivamente. Se determinó un NOAEL para la exposición de crónica de cadmio a través del agua y de los alimentos de 0.005 y  $0.01 \text{ mg/kg/día}$  también respectivamente. Se aplicó un factor de incertidumbre de 10 a los NOAEL representando así la variabilidad de los seres humanos con el fin de determinar las dosis referenciales para el agua y los alimentos.

### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

Actualmente no se dispone de una CR para el cadmio (USEPA 2004).

### Efectos Cancerígenos

Estudios epidemiológicos demuestran un aumento en la incidencia de cáncer pulmonar en trabajadores expuestos al cadmio mediante la ruta de la inhalación, sin embargo en los estudios no se controlaron factores tales como el nivel de tabaquismo y las exposiciones simultáneas a otros metales, de manera que la relación causal es de algún modo controversial. La exposición oral al cadmio no se asocia al cáncer en seres humanos, sin embargo los estudios disponibles se consideran como inadecuados para evaluar su carcinogenicidad. USEPA clasificó al cadmio en el grupo B2, es decir probable agente cancerígeno para los seres humanos, según datos limitados con respecto a los seres humanos y datos suficientes con respecto a los animales (USEPA 2004)

### Riesgo de Desarrollar Cáncer por Exposición Oral

Actualmente no se dispone de un factor de pendiente oral para el cadmio (USEPA 2004).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

*Health Canada* publicó un factor de pendiente de inhalación de  $42.9 \text{ (mg/kg/día)}^{-1}$  para el cadmio (*Health Canada* 2009).

Se realizó una evaluación cuantitativa del riesgo de desarrollar cáncer debido a la exposición por inhalación y se calculó el riesgo unitario aéreo en  $1.8\text{E-}3 \text{ (}\mu\text{g/m}^3\text{)}^{-1}$  (USEPA 2004).

### **Resumen**

|                                |                                                       |                  |            |
|--------------------------------|-------------------------------------------------------|------------------|------------|
| DR crónica oral                | 1E-3 mg/kg/día<br>(alimentos)                         | proteinuria      | USEPA 2004 |
| DR crónica oral                | 5E-4 mg/kg/día (agua)                                 | proteinuria      | USEPA 2004 |
| CR por inhalación              | no disponible                                         |                  | USEPA 2004 |
| factor de pendiente oral       | no disponible                                         |                  | USEPA 2004 |
| riesgo unitario por inhalación | $1.8\text{E-}3 \text{ (}\mu\text{g/m}^3\text{)}^{-1}$ | cáncer de pulmón | USEPA 2004 |

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## **Cromo (III y VI)**

### **Farmacocinética**

#### Exposición Oral

La absorción del cromo después de una exposición oral, dérmica o por inhalación depende básicamente de dos factores: el estado de valencia del átomo del cromo y a lo que esté fijado (es decir, la forma del enlace) (ATSDR 2000). La absorción de Cr(VI) es mayor que la de Cr(III) debido a que el ion cromato ( $\text{CrO}_4$ )<sup>-2</sup> puede ingresar a las células mediante la difusión facilitada a través de canales del anión, mientras que Cr(III) se absorbe mediante difusión pasiva o fagocitosis (ATSDR 2000). Estudios sobre exposición oral encontraron que la absorción del Cr(III) en la forma altamente soluble del óxido de cromo no es detectable y la absorción del Cr(III) en forma de compuestos dietéticos es entre 0.5 y 2.0% después de haberse ingerido (ATSDR 2000). El cromo se distribuye a muchos órganos, estudios de autopsias en los Estados Unidos reportan las concentraciones más altas en los riñones, el hígado, los pulmones, la aorta, el corazón, el páncreas y el bazo (al nacer), lo que tiende a disminuir con la edad. Los estudios con animales revelan una distribución similar de cromo después de exposición oral, debido a que la absorción es relativamente baja y la trayectoria principal de excreción son las heces. Un estudio realizado con seres humanos expuestos a Cr(III) (en forma de cloruro de cromo) y Cr (VI) (en forma de cromato de sodio) marcados en forma radioactiva, reportó 99.6% y 89.4% respectivamente en las heces seis horas posteriores a la exposición y 0.5% y 2.1% en la orina 24 horas posteriores a la exposición. Se reportaron niveles similares de excreción fecal en estudios realizados con ratas y hámsters.

#### Exposición por Inhalación

Estudios sobre exposición por inhalación establecen que el cromo se absorbe a través de los pulmones y del tracto gastrointestinal (después de la depuración mucociliar de partículas de los pulmones). En la mayoría de los estudios los compuestos de Cr(VI) se absorbieron más rápidamente en los pulmones que el Cr(III), y se observó que el tamaño y la solubilidad de la partícula, así como la actividad de las macrófagas alveolares afectan las tasas relativas de absorción. Debido a su alto punto de ebullición, la mayor parte del cromo en el aire se encuentra fijado a partículas o cromo disuelto en pequeñas gotas y no en forma gaseosa. Posterior a la exposición por inhalación en seres humanos, el cromo se distribuye a los ganglios linfáticos hilares, los pulmones, el bazo, el hígado, los riñones y el corazón luego de una exposición ocupacional (ATSDR 2000). El cromo también se puede transferir al feto a través de la placenta y a los infantes a través de la leche materna. En estudios con animales se encontró que los órganos afectados corresponden a los mismos. Los trabajadores expuestos a compuestos de Cr(VI) poseen concentraciones urinarias más altas de cromo en comparación con los trabajadores expuestos al Cr(III).



### Exposición Dérmica

Los estudios sobre exposición dérmica demuestran que el cromo también se absorbe en forma transdérmica, dependiendo la tasa de transferencia de la integridad de la piel (ATSDR 2000). Se observó toxicidad sistémica en seres humanos después de una exposición dérmica a una mezcla de compuestos de cromo. Como ejemplo, catorce (14) días después de la exposición a una pomada contentiva de cromato de potasio con el fin de tratar la escabiosis, se encontró cromo en la sangre (2 a 5 mg/100 mL), orina (8 mg/L), heces (0.61 mg/100 g) y contenidos estomacales (0.63 mg/100 mL); un caso preexistente de escabiosis o necrosis que causó agrietamiento de la piel podría haber facilitado la absorción. También se observó la absorción dérmica de los animales en conejillos de indias debido a que en estudios con marcadores radioactivos se reportó la distribución del Cr(III y VI) en la sangre, el bazo, la médula ósea, los ganglios linfáticos, la orina y los riñones, con mayor absorción de la forma (VI). La información referente a la excreción del cromo después de una exposición dérmica es limitada, el estudio con seres humanos en donde se aplicó una pomada de cromato de potasio, encontró 8 mg/L de cromo en la orina y 0.61 mg/100 g en las heces 14 días posteriores a la exposición.

### Efectos no Cancerígenos

#### Exposición Oral

Se conoce que la ingesta accidental o intencional de compuestos de cromo causa la muerte en los seres humanos, las autopsias revelan efectos incluyendo edemas, bronquitis grave, bronconeumonía aguda, cambios hipóxicos tempranos en el miocardio, congestión hepática y necrosis del hígado, los túbulos renales y el tracto gastrointestinal (ATSDR 2000). Los efectos gastrointestinales causados por la ingesta de 7.5 mg/kg de Cr(VI) incluyeron dolor abdominal y vómitos (antes de la muerte). Los efectos hematológicos a raíz de la absorción oral en seres humanos incluyen la reducción del contenido de hemoglobina y hematocritos y un aumento del recuento sanguíneo, recuento de reticulocitos y hemoglobina en plasma 4 días después de la ingesta de dicromato de potasio (Cr(VI)). El daño hepático después de la ingesta de Cr(VI) incluyó ictericia, aumento de la bilirrubina y aumento de la deshidrogenasa láctica en suero con daño renal que incluye fallo renal agudo, con proteinuria y hematuria. Un estudio con ratas reportó que la exposición oral por sonda de 13.5 mg/kg/día de Cr(VI) en forma de cromato de potasio durante 20 días originó un aumento de las acumulaciones de lípidos, reubicación de las enzimas hepáticas y un aumento de la acumulación de lípidos, acumulación de triglicéridos y fosfolípidos en diferentes regiones de los riñones. Se observaron disminuciones significativas en el aumento del peso corporal en un estudio con ratas expuestas a 42 mg/kg/día de Cr(VI) durante 12 semanas (causando una disminución del 19%) y 6 mg/kg/día durante 12 semanas (causando una disminución del 10%). También se reportaron efectos en el desarrollo y la reproducción de animales en estudios de exposición oral.

Los estudios de exposición oral del cromo (III) son contradictorios, presentando NOAEL variando entre los 9 mg/kg/día en ratas (administrados diariamente en los alimentos durante 20 semanas) y los 2040 mg/kg/día en ratas (administrados en los alimentos durante 2 años, 5 días/semana). Los LOAEL con exposición oral de cromo (III) en ratas oscilaron entre los 5 mg/kg/día (administrados en agua durante 12 semanas), causando la disminución del peso corporal y los 2365 mg/kg/día después de una sola dosis por sonda con agua, causando la muerte en el 50% de la población (ATSDR 2000).

Estudios de exposición oral de cromo (VI) encontraron NOAEL variando entre los 1.1 mg/kg/día en ratones machos (administrados durante 9 semanas en los alimentos) y los 53.2 mg/kg/día en ratones hembras (administrados en agua durante 9 días, para los días de gestación 6 a 14). Los LOAEL orales para el cromo (VI) fluctuaron entre los 0.036 mg/kg/día en seres humanos (administrados una sola vez, causando dermatitis) y los 811 mg/kg/día en ratones machos (administrados una sola vez, correspondientes a un valor de  $DL_{50}$ ) (ATSDR, 2000).

#### Exposición por Inhalación

Estudios sobre la toxicidad del cromo después de una exposición por inhalación reportan que el tracto respiratorio es el objetivo principal en los seres humanos y después de una exposición a concentraciones elevadas de cromo se presentaron casos de disnea, tos y respiración sibilante (ATSDR 2000). También se observa que las exposiciones inmediatas y crónicas aumentan el riesgo de desarrollar enfermedades respiratorias no cancerígenas que podrían causar la muerte. La exposición ocupacional regular ocasionó dolor estomacal, úlceras en el duodeno, gastritis, cólicos estomacales y indigestión frecuente (la duración promedio de la exposición fue de 7.5 años y las concentraciones medias fueron de  $0.004 \text{ mg/m}^3$  de  $\text{Cr(VI)}$ ). Los efectos hepáticos incluyen el trastorno de las células del hígado, necrosis, infiltración de linfocitos e histiocitos y aumento de las células de Kupffer. El daño renal se manifiesta por la presencia de cilindros de glóbulos blancos y glóbulos rojos en la orina.

Estudios sobre la inhalación del cromo (III) encontraron NOAEL entre los  $0.022 \text{ mg/m}^3$  en seres humanos (a raíz de la mezcla de  $\text{Cr(III)}$ , (VI) y cromita, durante un periodo de 8 años) hasta los  $1.99 \text{ g/m}^3$  (también en seres humanos, a raíz de una mezcla de  $\text{Cr(III)}$  y (VI) después de una exposición crónica (ATSDR 2000). El LOAEL para cáncer de pulmón a partir de la exposición al cromo (III) corresponde a  $0.04 \text{ mg/m}^3$  en seres humanos durante 1 a 49 años de exposición ocupacional (ATSDR 2000).

Estudios sobre la inhalación de cromo (VI) encontraron NOAEL variando desde  $0.022 \text{ mg/m}^3$  en seres humanos (a raíz de una mezcla de  $\text{Cr(III)}$ , (VI) y cromita durante un periodo de 8 años) hasta los  $1.99 \text{ g/m}^3$  (también en seres humanos, a raíz de una

mezcla Cr (VI) y (III) después de una exposición crónica (duración no especificada) (ATSDR 2000). Se reportó un LOAEL para el cromo (VI) de 0.002 mg/m<sup>3</sup> después de 0.2 a 23.6 años de exposición ocupacional en seres humanos (causando atrofia de la mucosa nasal y leve disminución de la función pulmonar) (ATSDR 2000).

#### Exposición Dérmica

La absorción después de una exposición dérmica al Cr(VI) aumenta debido a la naturaleza cáustica de muchos compuestos de Cr(VI) y con frecuencia origina quemaduras y toxicidad sistémica (ATSDR 2000). Estudios ocupacionales sobre la exposición dérmica reportan que el contacto directo con polvo y emanaciones de cromo origina irritación de la nariz y la garganta. Un estudio en donde se aplicó una pomada contentiva de cromato de potasio a los participantes (para tratar la escabiosis) descubrió efectos cardiovasculares que incluyen pulso débil y marcadamente dicrótico, nefritis aguda, leucocitosis grave y síntomas de anemia hemolítica (ATSDR 2000). La dermatitis por contacto en personas sensibles y otras irritaciones cutáneas incluyen quemaduras, ampollas y úlceras en la piel. En un estudio de trabajadores con cromato en los Estados Unidos, el 50% del grupo de estudio presentó úlceras o cicatrices en la piel. Los estudios con animales reportan efectos dérmicos similares después de una exposición, con una aplicación de 42 a 55 mg/kg de Cr(VI), los conejos mostraron efectos tales como inflamación, edemas y necrosis de la piel.

### **Valores Referenciales de Toxicidad – Puntos Finales no Cancerígenos**

#### Dosis Referencial para la Exposición Oral Crónica (DR)

USEPA estableció una DR para el Cr(III) (sales solubles) de 1.5 mg/kg/día basada en un estudio de alimentación crónica a ratas (Ivankovic y Preussman 1975, según se cita en USEPA 1998a) (efectos no especificados) con un NOAEL de 5% de Cr<sub>2</sub>O<sub>3</sub> administrado en la dieta durante 5 días/semana y 600 comidas (ajustadas a 1,468 mg/kg/día) (USEPA 1998a). El factor de incertidumbre total fue de 100 incluyendo un factor de 10 para la conversión de interespecies y otro factor adicional de 10 para proteger a las sub-poblaciones sensibles. Se utilizó un factor de modificación de 10 con el fin de representar las deficiencias en la base de datos. La confianza se considera baja por la calidad del estudio, la base de datos y el valor de la DR; debido a la falta de (a) una metodología de estudio y resultados detallados, (b) datos que sustenten una dosis alta y (c) un nivel de efecto observado en cualquier dosis (es decir se asignó el NOAEL a la dosis más alta de los ensayos).

La DR para el Cr(VI) corresponde a 3E-3 mg/kg/día, lo que refleja una mayor toxicidad que con el Cr(III), según un estudio con agua potable realizado con ratas durante 1 año. El NOAEL se reportó como 25 mg/L K<sub>2</sub>CrO<sub>4</sub> (ajustado a 2.5 mg/kg/día) (USEPA, 1998b), el factor de incertidumbre total fue de 300, compuesto por un factor de 10 para la conversión de interespecies, un factor de 10 para proteger a las sub-poblaciones

sensibles y un factor adicional de 3 para la duración de la exposición del estudio principal que no fue de por vida. Se reportó la confianza en la DR oral como baja debido al pequeño número de personas que participaron del ensayo, a la poca cantidad de parámetros medidos y a la falta de efecto tóxico en la dosis más alta del ensayo. La confianza en la base de datos se considera también como baja debido a la falta de calidad de los estudios de soporte y a la falta de características de la toxicidad en el desarrollo.

#### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

Actualmente no se dispone de La CR del Cr(III) en forma de sales insolubles debido a la falta de datos de ensayos adecuados (USEPA 1998a).

La CR del Cr(VI) se divide según su estado físico en vapores de ácido de cromo /aerosoles disueltos y partículas.

- La CR del Cr(VI) en forma de *vapores de ácido de cromo /aerosoles disueltos* correspondió a  $8\text{E-}6 \text{ mg/m}^3$  según un estudio ocupacional sub-crónico con seres humanos (con un efecto crítico de atrofia del tabique nasal) (USEPA 1998b). No se determinó un valor de NOAEL, sin embargo el LOAEL se reporta como  $2\text{E-}3 \text{ mg/m}^3$  (ajustado a un equivalente de  $7.14 \text{ E-}4 \text{ mg/m}^3$  para seres humanos). El factor de incertidumbre para esta CR es 90, y la confianza en este estudio, la base de datos y el valor de la CR se considera como baja debido a las incertidumbres sobre las características de la exposición y al papel del contacto directo en el efecto crítico (los estudios de soporte se consideran igualmente inciertos con respecto a las características de la exposición).
- La CR del Cr(VI) en forma de *partículas* es  $1\text{E-}4 \text{ mg/m}^3$  según un análisis con dosis de referencia (BMD) de un estudio sub-crónico con ratas, con lactato deshidrogenasa en el fluido del lavado broncoalveolar como el efecto crítico. La BMD correspondió a  $0.016 \text{ mg/m}^3$  (ajustada a una concentración equivalente de  $0.034 \text{ mg/m}^3$  para seres humanos) y el factor de incertidumbre es 300. La confianza en el estudio y el valor de la CR se considera como medio debido a las incertidumbres con respecto a los efectos en las vías respiratorias superiores, el sistema reproductor y los riñones como resultado de la exposición a partículas de Cr(VI).

ATSDR (2000) desarrolló un nivel mínimo de riesgo por inhalación intermedia (NMR) para el cromo (VI) (dicromato de sodio) de  $0.001 \text{ mg de cromo (VI)/m}^3$  en forma de compuestos de partículas de acuerdo a un estudio realizado con ratas por Glaser 1990, según se cita en ATSDR 2000). Se determinó una dosis comparativa de  $0.016 \text{ mg de cromo (VI)/m}^3$  sobre la base de alteraciones en la lactato deshidrogenasa del fluido del lavado bronquial en ratas. La concentración comparativa se ajustó para una exposición inminente y se utilizó un factor de incertidumbre de 30 para deducir el NMR por inhalación intermedia. En el factor de incertidumbre se incluyó un factor de 3 con el fin

de representar la extrapolación de animales a humanos y un factor de 10 por la disponibilidad de seres humanos. Se puede aplicar un factor de incertidumbre adicional al NMR por inhalación intermedia para aproximar un NMR por inhalación crónica, originando un NMR por inhalación crónica de  $1\text{E-}4 \text{ mg/m}^3$ .

### Efectos Cancerígenos

USEPA clasificó al cromo (III) como un cancerígeno del grupo D, es decir no clasificable como cancerígeno para los seres humanos, debido a la falta de información con respecto a los seres humanos y a los datos inadecuados de estudios con animales (USEPA 1998a). La información sobre exposiciones de seres humanos al Cr(III) sólo se dispone con referencia a exposiciones concomitantes al Cr(VI). Los estudios sobre exposición oral en ratas y ratones demuestran un potencial cancerígeno negativo. Los estudios sobre la inhalación de Cr(III) en animales de laboratorio no ocasionaron la reducción de la incidencia de tumores pulmonares (USEPA 1998a). La Agencia Internacional para la Investigación del Cáncer (IARC 1990) clasificó al cromo (III) en el grupo 3, es decir no clasificable con respecto a la carcinogenicidad para los seres humanos.

El cromo (VI) se clasifica como un cancerígeno del grupo A, es decir cancerígeno conocido para los seres humanos, mediante la ruta de exposición por *inhalación* (USEPA 1998b). En estudios con seres humanos se reporta cáncer pulmonar, según datos que concuerdan con estudios realizados con animales, los tipos de tumor incluyen tumores en el punto de inyección intramuscular en ratones y ratas, tumores en el área de implantes intrapleurales en ratas, tumores en el área de implantación intrabronquial en ratas y sarcomas en el punto de inyección subcutánea en ratas (USEPA, 1998b). No ha sido posible determinar la carcinogenicidad de la ruta de exposición oral y en consecuencia el Cr(VI) se clasifica en el grupo D, es decir no clasificable. La Agencia Internacional para la Investigación del Cáncer (IARC 1990) clasificó al cromo (VI) en el grupo 1, es decir cancerígeno para los seres humanos.

### ***Genotoxicidad (Incluyendo Mutagenicidad)***

#### **Cromo (III)**

En general el Cr(III) no resultó mutágeno en ensayos bacterianos cuando se analizó con o sin activación metabólica exógena (Venitt y Levy 1974; Petrelli y Deflora 1977, 1978a,b; según se cita en USEPA 1998a). Un estudio con *Bacillus subtilis* encontró una respuesta mutagénica débil con el Cr (III) en comparación con el Cr(III) (Nakamuro 1978 según se cita en USEPA 1998a,c).

La información referente a la interacción del Cr(III) con el ADN es contradictoria debido a que se encontró que diversos compuestos de Cr(III) son clastogénicos, por ejemplo el  $\text{CrCl}_3$  en células de BALB/c (Raffetto 1977, según se cita en USEPA 1998c) y células

de hámsters chinos Don (Ohno 1982, según se cita en USEPA 1998c);  $\text{CrCl}_3$ ,  $\text{Cr}(\text{NO}_3)_3$ ,  $\text{KCr}(\text{SO}_4)_2$ , o  $\text{Cr}(\text{CH}_3\text{COO})_3$  en células ováricas de hámsters chinos (Levis y Majone 1979, según se cita en USEPA 1998c) y  $\text{Cr}(\text{CH}_3\text{COO})_3$  en leucocitos humanos cultivados (Ohno 1982, según se cita en USEPA 1998c). Sin embargo otros estudios no han encontrado que el  $\text{Cr}(\text{III})$  sea clastogénico incluyendo el  $\text{Cr}_2(\text{SO}_4)_3$  en células FM3A de ratones (Umeda y Nishimura 1979, según se cita en USEPA 1998c) y células de hámsters chinos Don (Ohno 1982, según se cita en USEPA 1998c); y el  $\text{CrCl}_3$  y  $\text{Cr}(\text{NO}_3)_3$  en leucocitos humanos cultivados (Nakamuro 1978, según se cita en USEPA 1998c).

Generalmente los compuestos de cromo (III) son menos tóxicos que los compuestos de  $\text{Cr}(\text{VI})$ , debido a que los compuestos de  $\text{Cr}(\text{III})$  no atraviesan la membrana celular a diferencia de los compuestos de  $\text{Cr}(\text{VI})$  (ATSDR 2000). Sin embargo una vez que los compuestos de  $\text{Cr}(\text{III})$  ingresan a las células, al parecer son más genotóxicos que los compuestos de  $\text{Cr}(\text{VI})$  en objetivos sub-celulares *in vitro*, pero no en sistemas celulares (ATSDR 2000).

### Cromo (VI)

Los compuestos de cromo (VI) resultaron positivos en la mayoría de los ensayos realizados y su genotoxicidad se relacionó con la solubilidad y biodisponibilidad para los sistemas objetivo (ATSDR 2000). El cromo hexavalente se absorbe rápidamente por las células mediante el sistema de transporte del sulfuro y se reduce a la forma trivalente por los sistemas celulares. Se demostró que el cromo hexavalente es genotóxico únicamente en presencia de los agentes de reducción apropiados *in vitro* o en sistemas celulares viables *in vitro* o *in vivo* (USEPA 1998d). También se demostró que el cromo hexavalente es mutágeno en sistemas bacterianos en ausencia de sistemas de activación mamíferos (Venitt y Levy 1974, Nichioka 1975, Nakamuro 1978, Green 1976, Kanematsu 1980, Lofroth y Ames 1978, Newbold 1979, Bonatti 1976 y Fukanaga; 1982 según se cita en USEPA 1998d). Otros estudios indican que los compuestos de cromo (VI) no son mutágenos en presencia de un sistema de activación mamífero (Lofroth 1978, Petrilli y DeFlora 1977, 1978a, 1978b; según se cita en USEPA 1998d). USEPA (1998d) indica que el cromo hexavalente demostró ser mutágeno en sistemas eucarióticos (*Saccharomyces cerevisiae* y *Schizosaccharomyces pombe*, Bonatti 1976, Newbold 1979, Fukanaga 1982; según se cita en USEPA 1998d) y clastógeno en células mamíferas cultivadas (Raffetto 197, Levis y Majone 1979, Umeda y Nishimura 1979, Tsuda y Kat 1977, Newbold 1979, Nakamuro 1978, Stella 1982, Ohno 1982, Gomez-Arroyo 1981, Wild 1978, y Sarto 1982; según se cita en USEPA 1998d).

La exposición oral a compuestos de cromo (VI) no indicó aumento de la incidencia de micronúcleos en eritrocitos policromáticos de ratones (Mirsalis 1996, según se cita en ATSDR 2000) o de síntesis de AND no programada en ratas (Coogan 1991, según se

cita en ATSDR 2000). Sin embargo se observó un aumento significativo de aberraciones cromosómicas en las células de la médula ósea de ratones que se expusieron a trióxido de cromo (IV) por sonda (Sarkar 1993, según se cita en ATSDR 2003). No se encontraron estudios sobre la genotoxicidad de humanos expuestos a Cr(VI) por vía oral (ATSDR 2003).

## Pendiente de la Curva de Factores del Cáncer

### Riesgo de Desarrollar Cáncer a Partir de una Exposición Oral

Actualmente no se dispone de un factor de pendiente oral para el Cr(III) en forma de sales insolubles (USEPA 1998a) y tampoco para el Cr(VI) (USEPA, 1998b).

### Riesgo de desarrollar cáncer a partir de una exposición por inhalación

*Health Canada* (2009) estableció un factor de pendiente de inhalación de  $(47.6 \text{ mg/kg/día})^{-1}$ .

Actualmente no se dispone de un factor de pendiente de inhalación para el Cr(III) en forma de sales insolubles (USEPA 1998a)

Según la ocurrencia de cáncer pulmonar en un estudio ocupacional con seres humanos el riesgo unitario aéreo para el Cr(VI) es  $1.2\text{E-}2 \text{ (}\mu\text{g/m}^3\text{)}^{-1}$  (USEPA 1998b).

La Organización Mundial de la Salud (OMS) dedujo un riesgo unitario en base a estudios entre trabajadores expuestos a cromo (VI) y su susceptibilidad al cáncer pulmonar. No se podría recomendar un nivel de seguridad para el cromo (VI) cuando se asume una relación lineal de dosis-respuesta. La OMS estimó un riesgo de por vida de  $4.0 \times 10^{-2}$  con una concentración en el aire de  $1 \mu\text{g/m}^3$ .

## Resumen

### Cromo total

#### Cr(III)

|                                   |               |                        |             |
|-----------------------------------|---------------|------------------------|-------------|
| DR crónica oral                   | 1.5 mg/kg/día | NOAEL                  | USEPA 1998a |
| CR por inhalación                 | 1.5 mg/kg/día | extrapolación por ruta |             |
| factor de pendiente oral          | no disponible |                        | USEPA 1998a |
| factor de pendiente de inhalación | no disponible |                        | USEPA 1998a |

### Cr(VI)

|                                             |                                       |                        |             |
|---------------------------------------------|---------------------------------------|------------------------|-------------|
| DR crónica oral                             | 3E-3 mg/kg/día                        | NOAEL                  | USEPA 1998b |
| CR por inhalación (a)                       | 8E-6 mg/m <sup>3</sup>                | daño nasal             | USEPA 1998b |
| CR por inhalación (b)                       | 1E-4 mg/m <sup>3</sup>                | efectos en pulmones    | USEPA 1998b |
| DR <sub>i</sub> por inhalación <sup>1</sup> | 2.86E-6 mg/kg/día                     | conversión de unidades |             |
| factor de pendiente oral                    | no disponible                         |                        | USEPA 1998b |
| riesgo unitario por inhalación              | 40 (mg/m <sup>3</sup> ) <sup>-1</sup> | cáncer pulmonar        | OMS 2000    |

Nota: existen dos valores de CR para el Cr(VI); (a) se refiere a vapores y aerosoles de ácido de cromo, (b) se refieren a partículas. La CR para partículas se utilizó en esta evaluación de riesgos.

<sup>1</sup> seleccionado para esta evaluación de riesgos.

<sup>2</sup> se aplicó un factor de corrección de 10X a la DR crónica oral para representar la posible mutagenicidad.

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## **Cobalto**

### **Farmacocinética**

#### Exposición Oral

El consumo oral de cobalto origina absorción mediante el tracto gastrointestinal; los niveles de absorción varían entre el 18 al 97% en seres humanos y depende de la dosis y de la forma del cobalto así como también del estado nutricional de las personas expuestas. La absorción de cobalto tiende a aumentar en personas con deficiencia de hierro en su dieta y su eliminación en las heces es el método de excreción principal para exposiciones orales.

#### Exposición por Inhalación

Las partículas de cobalto inhalado se acumulan en el tracto respiratorio y el tamaño de la partícula determina si la acumulación ocurre en el tracto superior o inferior. Las partículas más grandes ( $> 2 \mu\text{m}$ ) tienden a acumularse en el superior, mientras que las partículas más pequeñas se transfieren al sistema respiratorio inferior. Desde los pulmones las partículas de cobalto se disuelven en el torrente sanguíneo o se transfieren al tracto gastrointestinal mediante acciones como la deglución. Aproximadamente el 50% del cobalto transferido al tracto gastrointestinal es realmente absorbido y el resto se elimina por medio de excreción fecal. Aproximadamente el 50% de la carga pulmonar inicial puede permanecer hasta 6 meses después de la exposición (Foster 1989, según se cita en ATSDR 1992).

#### Exposición Dérmica

La exposición dérmica de seres humanos (solo las manos) a polvo de metales duros (aproximadamente entre 5 a 15% de metal de cobalto, 95–85% de carburo de tungsteno) durante 90 minutos mostró un aumento en los niveles de cobalto en la orina en un orden de magnitud de hasta 60 horas después de la exposición. La absorción de  $2.2 \times 10^{-5}$  mg de  $^{60}\text{Co}/\text{kg}$  en forma de cloruro de cobalto a través de la piel intacta o escoriada de conejillos de indias reveló que la absorción es muy limitada a través de piel intacta ( $<1\%$ ), mientras que la absorción a través de piel escoriada fue de casi 80%. No se dispone de estudios sobre la distribución en seres humanos o animales después de una exposición dérmica al cobalto. La excreción de cobalto en hámsters ocurre principalmente en la orina dentro de 48 horas después de una sola exposición dérmica.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

El cobalto es un elemento esencial para los seres humanos y es necesario para la producción de la vitamina B<sub>12</sub> (ATSDR 1992). Se encuentra en la mayoría de los tejidos corporales y las concentraciones más altas se ubican en el hígado, los riñones y los huesos. La vitamina B<sub>12</sub> es una coenzima de muchas reacciones biológicas incluyendo la producción de glóbulos rojos y el cobalto se ha utilizado para tratar la anemia. La Ración Alimenticia Recomendada (RDA) de la vitamina B<sub>12</sub> para adultos es 2.4 µg/día, (esta cantidad contiene 0.1 µg de cobalto) (ATSDR 1992). La exposición oral a altos niveles de cobalto se presenta en seres humanos que consumieron cerveza con sales de cobalto; en los años 60's las sales de cobalto se añadían a la cerveza para mejorar sus cualidades espumantes. Esta práctica se discontinuó desde ese entonces ya que causó varias muertes entre consumidores frecuentes (8 a 30 pintas por día) quienes consumieron dosis entre los 3 a los 10 mg de cobalto/por día. Efectos menos graves asociados con el consumo de cerveza con compuestos de cobalto incluyeron náuseas, vómitos y diarrea. El aumento de la producción de glóbulos rojos también ocurre en los seres humanos después de la exposición oral al cobalto. Se ha observado una reducción de la absorción del yodo en la glándula tiroides de seres humanos expuestos a dosis de corto tiempo de 1 mg/kg del peso corporal/día o dosis de largo tiempo de 0.54 mg/kg del peso corporal /día.

No se observaron efectos en el desarrollo de bebés nacidos de madres que tomaron medicamentos que contenían cobalto para regular su anemia durante el embarazo (Holly 1955, según se cita en ATSDR 1992). Tampoco se observaron efectos en el sistema reproductivo de las personas que murieron después de exponerse a altos niveles de cobalto en la cerveza. Se han observado algunos efectos en el sistema reproductivo de animales (efectos adversos en los ensayos y reducción de la duración del ciclo estral), sin embargo la importancia de estos efectos para los seres humanos no está clara ya que las dosis de cobalto utilizadas en los estudios fueron mucho más altas que las dosis a la que usualmente se exponen los seres humanos.

#### Exposición por Inhalación

La inhalación de cobalto puede afectar el sistema respiratorio y si se inhala en cantidades suficientes (0.003 mg/m<sup>3</sup>) se puede presentar irritación, respiración sibilante, asma y neumonía. La exposición ocupacional a concentraciones de cobalto de 0.038 mg/m<sup>3</sup> durante seis horas causó dificultades respiratorias, aunque estos niveles son aproximadamente de 10,000 a 100,000 veces más altos que la típica concentración en el aire en lugares abiertos. Las personas también pueden desarrollar sensibilidad al cobalto a través de la exposición ocupacional a concentraciones de

$\geq 0.007 \text{ mg/m}^3$  y exposiciones posteriores pueden ocasionar erupciones cutáneas o ataques de asma.

### Exposición Dérmica

Se reportó pérdida de peso en estudios realizados con animales con varios compuestos de cobalto. Se observó la necrosis del timo en ratas expuestas a  $19 \text{ mg/m}^3$  en forma de sulfato de cobalto y se encontró hiperplasia de los ganglios linfáticos mediastinales en ratones expuestos a  $11.4 \text{ mg/m}^3$ . Se reportaron efectos neurológicos tales como congestión de los vasos del cerebro/meninges en ratas y ratones expuestos a  $\geq 19 \text{ mg/m}^3$  en forma de sulfato de cobalto. Se reportaron también diversos impactos en el sistema reproductivo incluyendo atrofia testicular y disminución de la movilidad espermática en ratas y ratones expuestos a  $1.14\text{-}19 \text{ mg/m}^3$  durante tiempos de exposición intermedia y aguda, respectivamente.

### Dosis Referencial para la Exposición Oral Crónica (DR)

RIVM (2001) establece una IDT de  $0.0014 \text{ mg/kg}$  del peso corporal/día, este valor se dedujo en una evaluación previa de Vermeire (1991, según se cita en RIVM 2001) de acuerdo a un límite de migración para materiales de empaque. En el caso de los seres humanos el LOAEL más bajo reportado es  $0.04 \text{ mg/kg}$  del peso corporal/día, para cardiomiopatía después de una exposición oral intermedia. Se aplicó un factor de incertidumbre de 3 para variación entre seres humanos y un factor de 10 para extrapolación a un NOAEL, causando una IDT de  $0.0014 \text{ mg/kg}$  del peso corporal/día.

USEPA NCEA desarrolló una DR oral provisional de  $0.0003 \text{ mg/kg/día}$  (USEPA Región 3, 2009).

### Concentración Referencial para Exposición por Inhalación Crónica (CR)

No se dispone de una CR establecida por *Health Canada* (2009) o el sitio internet de USEPA IRIS, sin embargo el valor de la DR por inhalación provisional de USEPA NCEA es  $6\text{E-}6 \text{ mg/kg/día}$  (USEPA Región 3, 2009).

### Efectos Cancerígenos

No se ha demostrado que el cobalto cause cáncer en los seres humanos. Un estudio ocupacional informó un aumento en la incidencia de muertes por cáncer pulmonar entre trabajadores expuestos al cobalto en comparación con una población de control que no se había expuesto al cobalto. La diferencia entre los trabajadores expuestos y la población de control no se consideró estadísticamente significativa. Además la presencia de enfermedades pulmonares características asociadas con la exposición ocupacional al cobalto no se documentó, aunque la exposición concomitante a arsénico y níquel opacó los efectos observados. No se han observado tumores en seres

humanos con prótesis (es decir rodillas artificiales) que contenían aleaciones de cobalto.

La exposición al óxido de cobalto en hámsters no originó un aumento de la incidencia de tumores pulmonares en comparación con la población de control. La inyección intramuscular de óxido de cobalto originó la producción de tumores en ratas, pero no en ratones (Gilman 1962, según se cita en ATSDR 1992). Según los datos relacionados con animales, la Agencia Internacional para la Investigación del Cáncer clasificó al cobalto como posible agente cancerígeno para los seres humanos. Sin embargo actualmente no existe una clasificación de USEPA sobre carcinogenicidad (USEPA 2009).

#### Riesgo de Desarrollar Cáncer por Exposición Oral

Actualmente no se dispone de un factor de pendiente oral para el cobalto (USEPA 2009).

#### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No existe un factor de pendiente de inhalación de cobalto establecido por *Health Canada* (2004) o en el sitio internet de USEPA IRIS.

#### **Resumen**

|                                   |                  |                      |
|-----------------------------------|------------------|----------------------|
| DR crónica oral                   | 0.0003 mg/kg/día | USEPA Región 9, 2003 |
| IDT oral                          | 0.0014 mg/kg/día | RIVM, 2004           |
| DR por inhalación                 | 5.7E-6 mg/kg/día | USEPA Región 9, 2003 |
| factor de pendiente oral          | no disponible    | USEPA, 2009          |
| factor de pendiente de inhalación | no disponible    | USEPA, 2009          |

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## **Cobre**

### **Farmacocinética**

#### Exposición Oral

La absorción del cobre ocurre principalmente a través del tracto gastrointestinal y la tasa relativa de absorción se relaciona con la dosis administrada. Por ejemplo cuando se administró a adultos una dieta baja en cobre (0.78 mg de cobre al día), 55.6% del cobre administrado se absorbió en el tracto gastrointestinal tal como se determinó con el uso de isótopos (ATSDR 1990). En el caso de adultos con una adecuada ingesta alimenticia de cobre (1.68 mg de cobre al día), se observó un 36.3% de absorción y en el caso de los adultos con una alta ingesta diaria de cobre (7.53 mg de cobre al día), solo se observó un 12.4% de absorción. La absorción de cobre en adultos es saturable y el porcentaje de absorción se reduce cuando la ingesta diaria de cobre aumenta. La retención total de cobre aumentó con la ingesta alimenticia y el equilibrio apropiado se mantiene incluso con la concentración más baja estudiada (0.78 mg de cobre al día). La absorción de cobre y el metabolismo disminuyen debido a la competencia de otros metales tales como el hierro y el zinc que buscan lugares de fijación en la metalotioneína, mientras que el molibdeno puede inhibir totalmente la retención del cobre (ATSDR 1990). El hígado es el principal órgano involucrado en la distribución de cobre en todo el cuerpo, y la distribución del cobre en otros tejidos ocurre a través del torrente sanguíneo. Al parecer la ceruloplasmina (proteína que pueden fijar 6 a 8 átomos de Cu (II)) y la albúmina sérica son los principales portadores (ATSDR 1990). Las concentraciones de cobre más altas se encuentran en el cerebro, los riñones, el corazón, el hígado y el páncreas (ATSDR 1990) y la principal trayectoria de eliminación del cobre en el hígado es la bilis, que representa aproximadamente el 80% del cobre que sale del hígado. El embarazo se asocia con un aumento en la retención de cobre y se debe probablemente a la disminución de la excreción biliar que resulta de los cambios hormonales que usualmente ocurren. La excreción urinaria y la sudoración son contribuyentes menores de la eliminación del cobre (ATSDR 1990).

#### Exposición por Inhalación

No se encontraron estudios sobre la tasa y la extensión de la absorción después de una exposición por inhalación de cobre en seres humanos. Datos limitados sobre los animales revelan la absorción de óxido en los capilares alveolares 3 horas después que expusieron ratas a polvo de soldadura en aerosol proveniente de alambres de cobre puro. Se estimó que la vida media del sulfato de cobre en los pulmones de las ratas es de 7.5 horas luego de la instilación intratraqueal de 20 µg de cobre por rata.

#### Exposición Dérmica

Los estudios con animales demuestran que el cobre atraviesa barreras dérmicas cuando se aplica con ciertos vehículos (por ejemplo, ácido salicílico o fenilbutazona).

Sin embargo los estudios sugieren que el cobre (cloruro de cobre > sulfato de cobre) no se absorbe bien a través de piel intacta y menos del 6% del cobre se absorbe después de una aplicación *ex vivo* en piel humana.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

El cobre es un elemento esencial para los seres humanos y se encuentra ampliamente en todo el cuerpo, efectos adversos para la salud se pueden vincular a la deficiencia de cobre así como también a niveles excesivos del mismo; la deficiencia de cobre se demuestra con la anemia, neutropenia y anomalías óseas, pero raramente se observa en situaciones clínicas (ATSDR 1990). El cobre se considera esencial para el desarrollo de proteínas estructurales y enzimáticas, las enzimas que regulan la respiración celular, la desintoxicación de radicales libres, el metabolismo del hierro, la función neurotransmisora y la síntesis del tejido conectivo contiene cobre (ATSDR 1990). La regulación (activación y represión) de la transcripción de genes también necesita cobre (ATSDR 1990). El cuerpo regula las concentraciones de cobre mediante un proceso llamado homeostasis.

El cobre difícilmente es tóxico, a menos que se ingiera en grandes cantidades, los datos disponibles sobre su toxicidad asociada con el consumo oral de cobre se limitan a la ingesta de agua con concentraciones de cobre muy altas o intentos de suicidio que involucran al sulfato de cobre. La exposición crónica a agua potable que contenga (dosis aproximada de 0.06 mg de cobre/kg/día - 4.2 mg de cobre/día para un adulto de 70-kg) causó náuseas, vómitos y dolor abdominal poco después del consumo del agua (ATSDR 1990) y los problemas gastrointestinales se detuvieron después que se encontró un suministro de agua alternativo para las personas afectadas. Síntomas similares se observaron en pacientes que intentaron suicidarse (aunque la información sobre la dosis podría ser inexacta ya que la proporcionaron los mismos pacientes). Los efectos gastrointestinales se produjeron con dosis que van desde los 0.07 a los 1,421 mg de cobre/kg (4.9 a 99,470 mg de para un adulto de 70-kg) (ATSDR 1990).

La enfermedad de Wilson es un desorden genético asociado con el deterioro en el transporte del cobre del hígado hacia la bilis, originando un aumento de las concentraciones de cobre en el hígado, debido a que no pueden mantener la homeostasis. No se han observado efectos en el desarrollo de niños con madres que padecen la enfermedad de Wilson o en seres humanos sanos (ATSDR 1990). Los infantes y los niños menores de 1 año son inusualmente susceptibles a la toxicidad de cobre debido a que no han desarrollado el mecanismo homeostático para eliminar el cobre de cuerpo (ATSDR 1990). Otra condición genética que aumenta la susceptibilidad a la toxicidad del cobre es una deficiencia de la enzima glucosa-6-

fosfato deshidrogenasa. Las personas con una enfermedad hepática también son susceptibles a la toxicidad del cobre debido al papel crítico del hígado en la eliminación del cobre del cuerpo (ATSDR 1990).

Debido a que el cobre se considera un elemento esencial para los seres humanos, existen dos tipos de límites de exposición (a) la ingesta mínima diaria de manera que una persona no sufra de deficiencia de cobre y (b) las ingestas diarias máximas permisibles de manera que una persona no sufra debido a la toxicidad de cobre. Se ha encontrado toxicidad en el desarrollo de ratones, visones y hámsters que se alimentaron con una dieta rica en cobre o inyectados con cobre (ATSDR 1990). No se han observado efectos reproductivos en poblaciones de seres humanos expuestos a altos niveles de cobre. Los dispositivos intrauterinos que contienen cobre se utilizan como método anticonceptivo y estudios realizados con animales demuestran que los cables de cobre contenidos dentro de estos dispositivos son el agente contraceptivo.

#### Exposición por Inhalación

Trabajadores expuestos al polvo de cobre presentaron diversos síntomas respiratorios (irritación respiratoria que incluye tos, estornudos, dolor del tórax y goteo nasal), efectos gastrointestinales (anorexia, náuseas, diarrea), hematológicos (disminución de la hemoglobina y los eritrocitos), hepatomegalia, efectos endocrinológicos (adenoma hipofisario), reproductivos (impotencia) y otros efectos sistémicos (irritación ocular, escalofríos, fiebre, sequedad de la boca, dolor de cabeza. Se han observado efectos respiratorios leves (por ejemplo, engrosamiento alveolar) en hámsters, ratones y conejos expuestos a sulfato de cobre transportado por el aire (ATSDR 1990).

#### Exposición Dérmica

La exposición dérmica al cobre puede originar dermatitis (ATSDR 1990).

### **Dosis Referencial para la Exposición Oral Crónica (DR)**

#### Ingesta Diaria Mínima

La Organización Mundial de la Salud (OMS) determinó que la ingesta diaria mínima de cobre en adultos es de 0.020 mg de cobre/kg del peso corporal al día, lo cual equivale a 1.4 mg de cobre al día para un adulto promedio de 70 kg (USEPA 2004). En el caso de los niños, la OMS concluyó que la ingesta diaria mínima de cobre debe ser 0.050 mg/kg del peso corporal al día (equivalentes a 0.75 mg de cobre al día para un niño de 15 kg). Se determinó que la ingesta diaria mínima de cobre es la cantidad de cobre necesaria para que un niño o un adulto se desempeñen adecuadamente y que representa variables como las diferencias en la absorción, retención y almacenamiento del cobre.

### Ingesta Diaria Máxima Permissible

La ingesta diaria máxima permissible para adultos es algo incierta, pero se cree que está en el rango de 2-3 mg de cobre/día. La concentración máxima permissible considera estudios que indican que las personas expuestas a niveles más altos de cobre en el agua potable experimentaron molestias gastrointestinales temporales e incorpora un factor de seguridad de dos (es decir, la concentración máxima es la mitad del nivel en el cual se observaron efectos gastrointestinales). Actualmente solo existe información limitada sobre el nivel de la ingesta de cobre en los alimentos que podría causar un efecto adverso en la salud.

*Health Canada* (2009) estableció una ingesta diaria tolerable (IDT) de 0.09 mg/kg/día para niños pequeños y de 0.1 mg/kg/día para adultos y basó la ingesta diaria tolerable en una evaluación del Instituto de Medicina de los Estados Unidos (US IOM 2001) que determinó un nivel sin efectos adversos observados (NOAEL) de 10 mg/día para la función hepática de acuerdo a dos estudios con seres humanos sobre el consumo de tabletas de cobre. Se seleccionó un factor de incertidumbre (FI) de 1.0 debido a que el NOAEL se consideró representativo de la población general, no se consideró necesario un FI más alto debido a que los datos no indican efectos adversos ocasionados por el consumo diario de aproximadamente 10 mg/día de cobre en los alimentos e indican que el daño hepático a raíz de la exposición al cobre es poco común en poblaciones humanas con homeostasis de cobre normal. *Health Canada* (2009) ajustó el NOAEL basado en supuestos estándares de Canadá con respecto a la duración de las etapas de la vida y al peso corporal.

Actualmente no se dispone de una DR para el cobre elemental en el sitio internet de IRIS (USEPA 2004), sin embargo en la Tabla de Resumen de Evaluación de los Efectos para la Salud (HEAST) se incluye una DR oral de 0.04 mg/kg/día sobre la base de un LOAEL de una sola dosis oral de 5.3 mg en un estudio con seres humanos (con la ocurrencia de irritación gastrointestinal como el efecto crítico) (USEPA 1997).

### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

Actualmente no se dispone de una CR para cobre elemental de USEPA (2004) o *Health Canada* (2009).

RIVM dedujo una concentración tolerable en el aire (TCA) de 0.001 mg/m<sup>3</sup> sobre la base de un NOAEC para los efectos en los pulmones y el sistema inmune de conejos a partir de un estudio sobre toxicidad a corto plazo y un factor de incertidumbre de 100 (10 cada uno para variabilidad intra y interespecies) y un factor de 6 (5/7 x 6/24) para ajustarse a la exposición continua.

### Efectos Cancerígenos

USEPA clasificó al cobre y a los compuestos de cobre como parte del grupo D, es decir no clasificables como agentes cancerígenos para los seres humanos, la clasificación se utiliza para sustancias en las cuales existen datos inadecuados con el fin de realizar una evaluación sobre carcinogenicidad. Específicamente en el caso del cobre y de los compuestos del cobre, no existen datos relacionados con seres humanos, los datos sobre bioensayos con animales son inadecuados y los resultados de los ensayos sobre mutagenicidad no son claros (USEPA 2004b).

### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone con un factor de pendiente oral para el cobre (USEPA 2004).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de un valor de riesgo unitario por inhalación para el cobre (USEPA 2004).

### **Resumen**

|                                |                                 |                                      |                     |
|--------------------------------|---------------------------------|--------------------------------------|---------------------|
| IDT oral                       | 0.09 mg/kg/día (niños pequeños) |                                      | Health Canada, 2009 |
|                                | 0.10 mg/kg/día (adultos)        |                                      |                     |
| DR crónica oral                | 0.04 mg/kg/día                  | irritación gastrointestinal          | USEPA 1997          |
| TCA por inhalación             | 0.001 mg/m <sup>3</sup>         | efectos en pulmones y sistema inmune | RIVM 2001           |
| factor de pendiente oral       | no disponible                   |                                      | USEPA 2004          |
| riesgo unitario por inhalación | no disponible                   |                                      | USEPA 2004          |

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## **Hierro**

### **Farmacocinética**

#### Exposición Oral

La Academia Nacional de Ciencias de los Estados Unidos (US NAS) estimó como la biodisponibilidad máxima del hierro en los alimentos es de 18%, de acuerdo a los cálculos de la absorción de hierro hemínico y no hemínico de diversos tipos de alimentos (US NAS, 2002). El principal mecanismo para regular los niveles de hierro en el cuerpo humano son los cambios en la cantidad de hierro absorbido por la mucosa gastrointestinal. La absorción de hierro en la dieta se afecta por: la cantidad de hierro almacenado en el cuerpo; la cantidad y el tipo químico de hierro en los alimentos ingeridos y factores alimenticios.

#### Exposición Dérmica/Por Inhalación

No se han encontrado estudios sobre la farmacocinética del hierro como resultado de una exposición dérmica o por inhalación.

### **Toxicidad**

#### Efectos no Cancerígenos

##### Absorción Oral

El hierro es un elemento esencial y un componente importante de diversas proteínas incluyendo a enzimas y la hemoglobina. Gran parte del hierro del cuerpo (aproximadamente 67%) se encuentra en la hemoglobina de los eritrocitos que circulan en el torrente sanguíneo, otro 25% se almacena en una forma rápidamente movable y el resto se encuentra en la mioglobina del tejido muscular y en enzimas necesarias para el metabolismo de oxidación (US NAS 2002).

Los efectos clínicos asociados con la deficiencia de hierro incluyen anemia, retraso en el desarrollo, daño cognitivo y resultados adversos en embarazos. Los efectos de una intoxicación aguda con hierro están bien documentados, principalmente como resultado de niños que ingieren accidentalmente suplementos de hierro, los síntomas incluyen malestar gastrointestinal y también alteraciones cardiovasculares, metabólicas, neurológicas y hepáticas. Es difícil establecer dosis tóxicas orales debido a que generalmente se calculan a partir de historias clínicas en situaciones de sobredosis. No se asocian efectos adversos en el desarrollo con la ingesta de suplementos de hierro durante el embarazo. Existe cierta controversia con respecto a si las personas con una capacidad normal de eliminar el hierro pueden sufrir una sobrecarga crónica debido a la ingesta oral, sin embargo el peso de la evidencia indica que es posible.

Un estudio (Looker 1998, según se cita en USEPA 2001) comparó la ingesta alimenticia de los estadounidenses (de 6 meses a 74 años) con los índices bioquímicos (niveles de ferritina sérica) a partir de la base de datos del segundo estudio nacional sobre salud y nutrición NHANES II), los resultados de la comparación muestran que los niveles de ingesta promedio del hierro (0.15 a 0.27 mg/kg-día) consumido por la población son suficientes para protegerla contra la deficiencia de hierro e insuficientes para causar efectos tóxicos, el estudio concluyó que el rango de 0.15 a 0.27 mg/kg/día representa un NOAEL para la ingesta diaria crónica de hierro.

Se ha observado toxicidad crónica de hierro en personas con trastornos que originan absorción excesiva de hierro, anomalías en la síntesis de la hemoglobina, anemia o transfusiones sanguíneas frecuentes. US NAS (2002) indica que el peso de la evidencia no sustenta una relación causal entre la ingesta elevada de hierro y enfermedades coronarias debido a que cinco de siete estudios no encontraron una asociación entre la ferritina sérica y las enfermedades coronarias (Aronow y Ahn 1996, Frey y Krider 1994, Magnusson 1994, Manttari y Stampfer 1993; según se cita en US NAS, 2002). Sin embargo US NAS (2002) también indicó que los niveles elevados de hierro no se podían descartar definitivamente como un factor de riesgo de contraer enfermedades coronarias debido a que las altas concentraciones de ferritina sérica y la ingesta alimenticia de hierro han demostrado ser factores de riesgo para infartos del miocardio en un estudio con hombre del este de Finlandia (Salonen, según se cita en US NAS, 2001). El estudio también demostró que altos niveles de colesterol en lipoproteínas de baja densidad (LDL) junto con niveles elevados de ferritina sérica son un factor de riesgo significativo para infartos del miocardio y concluyó que concentraciones excesivas de hierro promueven la oxidación de LDL, lo cual eleva el riesgo de sufrir infartos del miocardio (US NAS, 2001). Un nuevo análisis de las mismas personas cinco años después confirmó las conclusiones (Salonen 1994, según se cita en US NAS, 2002).

La Academia Nacional de Ciencias de los Estados Unidos (USEPA, 2002) desarrolló recientemente las siguientes directrices para la ingesta de hierro que dan cuenta de las diferencias fisiológicas durante las etapas de la vida.

#### Exposición Dérmica y por Inhalación

No se encontraron estudios sobre la toxicidad del hierro debido a exposiciones dérmicas o por inhalación.

#### Dosis Referencial Provisional para la Exposición Crónica Oral (DR)

No se dispone de una ingesta diaria tolerable ni con una CR para el hierro (*Health Canada* 2009, USEPA 2009).



USEPA no ha evaluado el hierro de manera formal y por lo tanto no ha desarrollado una dosis referencial oral (DR). En 1997, se indicó en tablas HEAST (Tablas de Resumen de los Efectos para la Salud) la insuficiencia de los datos para una evaluación cuantitativa de riesgos. El Centro de Apoyo Técnico del Superfondo del Centro Nacional de Evaluación Ambiental de USEPA dedujo una dosis referencial provisional para el hierro que se utilizará en las áreas del Superfondo de los Estados Unidos (USEPA 2006). La dosis referencial provisional es actualmente la única dosis referencial toxicológica disponible para la evaluación del hierro en lugares contaminados. Las propiedades toxicológicas del hierro no se han evaluado por ATSDR o la Organización Mundial de la Salud (OMS).

USEPA (2006) seleccionó un NOAEL de 0.15 a 0.27 mg/kg/día tomando como base un estudio sobre la ingesta alimenticia del hierro y el estado del hierro en la población de los Estados Unidos. El rango de la ingesta de hierro se considera suficiente para brindar protección contra la deficiencia de hierro, sin causar efectos tóxicos. USEPA seleccionó un estudio realizado por Frykman (1994) como crítico para determinar una DR provisional adecuada, en dicho estudio se demostró que el tratamiento diario con 60 mg de hierro elemental /diario durante un mes causó un aumento estadísticamente significativo de los efectos gastrointestinales en comparación con el placebo. Con el fin de determinar un LOAEL, se añadió la LOAEL de 60 mg de hierro elemental al día a la ingesta alimenticia media estimada de 11 mg de hierro elemental/día (NAS 2001), lo que resulta 71 mg de hierro elemental/día. Considerando un peso corporal de 70 kg (USEPA 1987), la LOAEL para la ingesta diaria de hierro es 1 mg/kg/día en los efectos gastrointestinales. Un factor de incertidumbre de 1.5 tomando en cuenta los siguientes factores: 1.5 para extrapolación de un LOAEL a un NOAEL, 1 para el uso de personas sensibles, 1 para la exposición durante menos de una vida y 1 para una base de datos adecuada; de esta forma la DR provisional (subcrónica y crónica) para el hierro es 0.7 mg/kg/día.

USEPA (2006) realizó la siguiente declaración que establece los límites de la dosis referencial provisional, la determinación de la dosis se enfoca en lo que se considera una ingesta oral segura de hierro para la población de seres humanos en general (es decir personas aparentemente normales y sanas). Los requisitos individuales y las reacciones adversas al hierro podrían ser altamente variables y pudiera ser que la DR provisional no proteja a las personas con trastornos hereditarios relacionados con el metabolismo del hierro u otras afecciones que pudieran afectar la homeostasis del hierro.

#### Nivel Máximo de Ingesta Tolerable (NM)

La Academia Nacional de Ciencias también determinó un nivel máximo de ingesta tolerable (NS) para el hierro de 45 mg/día, estableciendo el malestar gastrointestinal como punto final (US NAS, 2001). Con el fin de determinar el valor, se utilizó un

estudio con hombres y mujeres suecos que tomaban un suplemento de hierro (Frykman, según se cita en US NAS, 2001) y dejaron de tomarlo debido a sufrir de malestar gastrointestinal. De esta forma se determinó un LOAEL de 60 mg/kg, sin embargo el estudio no fue suficiente para determinar un NOAEL. Se calculó un LOAEL de ingesta de hierro total (no solo a partir del suplemento) añadiendo el LOAEL determinado en el estudio sueco (60 mg/día) a la ingesta diaria estimada de hierro en los alimentos para hombres y mujeres escandinavos (11 mg/día), dando como resultado un LOAEL de 70 mg/día. Se seleccionó un factor de incertidumbre de 1.5 para extrapolación de un LOAEL a un NOAEL, resultando un nivel máximo de ingesta de 45 mg/día. La conversión de la ingesta diaria máxima a una dosis diaria máxima, asumiendo un peso corporal de 70 kg, origina una dosis diaria máxima de 0.64 mg/kg/día.

#### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

No se dispone de una concentración por inhalación tolerable ni una CR para el hierro (*Health Canada* 2009 USEPA 2009). En un intento por deducir una CR por inhalación crónica provisional, USEPA (2005a) concluyó que no existen datos adecuados sobre la inhalación en seres humanos o animales para la exposición al hierro o a compuestos de hierro orgánicos.

#### Efectos Cancerígenos

No se encontraron estudios que evalúen los efectos cancerígenos del hierro.

#### Riesgo de Desarrollar Cáncer por Exposición Oral

No se ha desarrollado un factor de pendiente oral para el hierro (*Health Canada*, 2009, USEPA 2009). USEPA (2005b) concluyó que la ausencia de datos adecuados que demuestren la carcinogenicidad en seres humanos impide deducir riesgos cancerígenos estimados cuantitativos para la ingesta de hierro u óxido de hierro.

#### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se ha desarrollado un factor de pendiente de inhalación para el hierro (*Health Canada* 2009, USEPA 2009). USEPA (2005b) concluyó que la ausencia de datos adecuados que demuestren la carcinogenicidad para los seres humanos impide deducir riesgos cancerígenos estimados cuantitativos para la inhalación de hierro u óxido de hierro.

## Resumen

|                                   |               |                          |
|-----------------------------------|---------------|--------------------------|
| DR crónica oral                   | 0.7 mg/kg/día | NOAEL, USEPA, NCEA, 2006 |
| CR por inhalación                 | no disponible | USEPA 2009               |
| Factor de pendiente oral          | no disponible | USEPA, 2009              |
| Factor de pendiente de inhalación | no disponible | USEPA, 2009              |

*nota:* La DR crónica oral es un valor provisional.

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Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc.

## **Plomo**

### **Farmacocinética**

#### Exposición Oral

La absorción gastrointestinal del plomo depende de la persona (la edad, cantidad de alimento en el estómago, estado nutricional del calcio y hierro) así como también de las características del plomo ingerido (tamaño de la partícula, solubilidad y especies químicas). Al parecer la absorción es más alta en los niños (40-50%) que en los adultos (15%) y el estado nutricional de los niños también afecta la absorción (las deficiencias de hierro y calcio parecen aumentar la absorción de plomo). Los adultos expuestos a compuestos de plomo solubles al agua mostraron una absorción mucho mayor si el plomo no se administra con la ingesta simultánea de comidas (20 a 70%) en comparación con aquellos a los que se administra plomo junto con la ingesta comida (3 a 15 %). Al parecer el contenido mineral (calcio o fosfato) en la comida reduce efectivamente la absorción del plomo ingerido. La absorción de plomo de la tierra es menor a la absorción de plomo disuelto y también se reduce con la ingesta simultánea de comidas, los adultos que consumieron plomo de la tierra sin una comida absorbieron 26% de la dosis, mientras que aquellos que ingirieron el plomo de la tierra sin una comida absorbieron solo el 2.5% (ATSDR 2007). La absorción de plomo podría aumentar durante el embarazo en combinación con una mayor movilización del plomo desde los huesos y pudiera contribuir con un aumento de los niveles de plomo en sangre durante la segunda mitad del embarazo. El mecanismo de absorción del plomo pareciera ser saturable, ya que la absorción se reduce cuando la ingesta de plomo aumenta.

La distribución y eliminación de plomo coinciden independientemente de la ruta de exposición, lo que indica la participación de un mecanismo de transporte de plomo común. La distribución inicial de plomo a los tejidos depende de la velocidad con la que la sangre llega a los órganos objetivo y posteriormente el plomo se puede volver a distribuir entre los tejidos. El plomo en la sangre se encuentra en el componente celular de los glóbulos rojos. Se han desarrollado varios modelos farmacocinéticos con el fin de calcular la distribución del plomo entre los grupos de tejidos y así caracterizar las tasas de intercambio de plomo entre ellos. La distribución de plomo es esencialmente la misma en niños y adultos, aunque una porción más grande de carga corporal reside en los huesos de los adultos, la mayor parte de esta carga corporal se encuentra en los huesos (94% en los adultos y 73% en los niños) (ATSDR 2007); en consecuencia los niveles de plomo en la sangre pudieran permanecer elevados durante algún tiempo una vez que la exposición termine. El plomo no se distribuye de manera uniforme en todo el hueso y tiende a acumularse en los lugares que experimentan desarrollo óseo (calcificación) al momento de la exposición, la calcificación ósea en niños ocurre con mayor frecuencia en huesos trabeculares y en los adultos en los huesos trabeculares y

corticales. La mayor parte del plomo adquirido en la niñez no se fija permanentemente en los huesos debido a que el plomo se libera o excreta frecuentemente durante la resorción ósea. El plomo no se metaboliza o transforma en el cuerpo, aunque no forma complejos con varias proteínas. El plomo en los alimentos que no se absorbe por el tracto gastrointestinal, se elimina en las heces.

#### Exposición por Inhalación

Se estima que la deposición de las partículas de plomo transportado en el aire en adultos es de aproximadamente 30 a 50% y depende del tamaño de la partícula y de la tasa de ventilación. Se absorbe (aproximadamente 100%) de todas las especies químicas de plomo que se deposita en los pulmones.

#### Exposición Dérmica

Al parecer la absorción dérmica del plomo es mucho menos significativa que la absorción por inhalación o ingestión (0.06% a <0.3%).

### **Toxicidad**

#### Efectos no Cancerígenos

##### Exposición oral

Los efectos tóxicos del plomo no dependen de la ruta de exposición, la muerte puede ser el resultado de exposiciones a plomo extremadamente elevadas correspondientes a niveles de plomo en la sangre de 125 a 750 µg/dL (327 µg/dL en promedio) en los niños. Puede haber incluso efectos cardiovasculares tales como las lesiones cardíacas debido a las altas exposiciones. La evidencia actual no indica que el aumento del plomo en la sangre aumente la presión sanguínea. Las personas expuestas a envenenamiento por plomo en el trabajo usualmente exhiben una combinación de síntomas gastrointestinales tales como dolor abdominal, estreñimiento, náuseas y vómitos. El plomo afecta la síntesis del hemo causando una disminución de las concentraciones de hemoglobina en la sangre, pudiendo ocasionar anemia. Las altas exposiciones de plomo también pueden causar un color azulado en las encías, debilidad muscular y dolor de las articulaciones.

Los niveles de plomo en la sangre que van desde 60 a >100 µg/dL en trabajadores expuestos al plomo en el trabajo se han asociado a efectos en los riñones, los efectos reversibles incluyen disfunción de los túbulos proximales así como también aumento de sodio y excreción de ácido úrico y la exposición crónica causa efectos renales irreversibles más graves. Los efectos adversos en el metabolismo de la vitamina D parecen ocurrir en niños expuestos al plomo en forma crónica (niveles de plomo en la sangre de 33 a 120 µg/dL) con deficiencias concomitantes de calcio, fósforo y vitamina D, los niños parecen ser más susceptibles a efectos neurológicos causados por el

plomo ya que dichos efectos se presentan con niveles de plomo en la sangre más bajos. Los adultos muestran daños neurológicos incluso con niveles en sangre de 40 a 60 µg/dL, mientras que varios estudios indican que los niños con niveles de plomo en la sangre de aproximadamente 10 µg/dL no presentan daño neuroconductual (Cooney 1989). Según indican los estudios, cuando los niveles de plomo en la sangre se duplican de 10 a 20 µg/dL, existe una pérdida promedio de 1 a 3 puntos del coeficiente intelectual, observada en exámenes estándar para su determinación (ATSDR 2007). Las altas exposiciones ocupacionales de plomo pueden causar efectos en el sistema reproductivo tales como abortos, abortos espontáneos y partos de fetos muertos, no se han observado efectos en la tasa de abortos espontáneos con niveles de plomo en la sangre de 10 µg/dL y los niveles bajos de exposición al plomo no se han correlacionado con la ocurrencia de anomalías congénitas.

Los niños pequeños (menos de 5 años de edad) son altamente susceptibles a efectos en la salud causados por el plomo debido a que poseen mayor capacidad de absorberlo a través del tracto gastrointestinal en comparación con los adultos. El comportamiento de los niños pequeños como chuparse el dedo pulgar y comer tierra los expone aún más al plomo de la tierra y del polvo. Las deficiencias nutricionales, especialmente la deficiencia de zinc, pudieran aumentar algunos de los efectos tóxicos del plomo. Las mujeres también podrían estar más expuestas al plomo ya que el embarazo, la lactancia y la osteoporosis hacen que los huesos pierdan minerales (se rompan) y con ello liberen plomo de los huesos hacia el torrente sanguíneo y causen un aumento de las cargas de plomo en el cuerpo y el aumento del plomo en la madre puede transferirse al feto a través de la placenta.

#### Exposición por Inhalación

Hombres adultos expuestos a partículas de plomo (0.003 o 0.01 mg lead/m<sup>3</sup>) durante 23 horas al día durante un periodo de 3 a 4 meses mostraron una disminución de las enzimas involucradas en la biosíntesis del hemo (ATSDR 2007).

#### Exposición Dérmica

Se encontraron estudios limitados sobre los efectos en seres humanos o animales después de una exposición dérmica a plomo inorgánico. La absorción dérmica de plomo inorgánico generalmente se considera mucho menor que la absorción que ocurre por inhalación o exposición oral (ATSDR 2007).

#### Ingesta Diaria Tolerable (IDT) y Dosis Referencial (DR) para la Exposición Oral Crónica

La ingesta diaria tolerable oral de plomo es 3.6E-3 mg/kg del peso corporal/día basada en un valor de ingesta diaria aceptable (IDA) deducida a partir de estudios metabólicos con infantes, que encontraron un NOAEL de 3E-3 a 4E-3 mg/kg del peso corporal con efectos críticos como el aumento de los niveles de plomo en la sangre y de la carga

corporal de plomo (*Health Canada* 2002). Se aplicó un factor de incertidumbre bajo de <2 basado en el nivel conservador de este punto final, la calidad de los datos metabólicos y el uso de una sub-población altamente susceptible (*Health Canada* 2002).

USEPA (2009) determinó que podrían presentarse efectos por la exposición al plomo, especialmente cambios en las enzimas de la sangre y en el desarrollo neurológico de los niños, con niveles de plomo en la sangre tan bajos que esencialmente no presenten un umbral. Como resultado de ello, USEPA considera inapropiado deducir un valor referencial de toxicidad oral (es decir DR) para el plomo.

#### Concentración Tolerable (CT) y Concentración Referencial (CR) para la Exposición Crónica por Inhalación

No se dispone de un valor para la concentración por inhalación tolerable de plomo de *Health Canada* (*Health Canada* 2009).

USEPA (2009) también determinó que es inadecuado deducir un valor referencial de toxicidad por inhalación (es decir, CR) para el plomo.

#### Efectos Cancerígenos

*Health Canada* clasificó al plomo en el grupo IIIB, es decir, posible agente cancerígeno para los seres humanos, sobre la base de datos inadecuados con respecto a los seres humanos y evidencia limitada relacionada con los animales (*Health Canada* 2009).

USEPA lo clasificó en el grupo B2, es decir probable agente cancerígeno para los seres humanos, sobre la base de los datos disponibles relacionados con los animales, los cuales indican que el plomo ingerido es cancerígeno, siendo los tumores renales el tipo de tumor más prevalente. Estudios epidemiológicos con seres humanos indican que el plomo podría causar un aumento de la incidencia del cáncer de pulmón y vejiga en general (ATSDR 2007), sin embargo estos estudios también carecen de información cuantitativa sobre la exposición al plomo y no se examinaron los factores que inducen a confusión ni la exposición concomitante a otros metales.

Actualmente USEPA (2009) no recomienda calcular el riesgo de desarrollar cáncer debido a la exposición al plomo utilizando procedimientos estándares para la evaluación de riesgos debido a la farmacocinética especial del plomo.

#### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de una dosis tumorigénica o factor de pendiente oral para el plomo o compuestos del plomo (*Health Canada* 2009, USEPA 2009).



### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de una concentración tumorigénica o factor de pendiente de inhalación para el plomo o sus compuestos (*Health Canada* 2009, *USEPA* 2009).

### **Resumen**

|                                      |                  |                           |                           |
|--------------------------------------|------------------|---------------------------|---------------------------|
| ingesta diaria tolerable             | 3.6E-3 mg/kg/día | acum. en<br>sangre/cuerpo | Health Canada 2009        |
| Dr oral crónica                      | no disponible    |                           | USEPA 2009                |
| Concentración tolerable              | no disponible    |                           | <i>Health Canada</i> 2009 |
| Cr por inhalación                    | no disponible    |                           | USEPA 2009                |
| factor de pendiente oral             | no disponible    |                           | USEPA 2009                |
| factor de pendiente de<br>inhalación | no disponible    |                           | HC 2009, USEPA 2009       |

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## ***Manganeso***

### **Farmacocinética**

#### **Exposición Oral**

El manganeso se encuentra usualmente en el tejido humano, la sangre, el suero y la orina. Los humanos adultos generalmente mantienen niveles constantes de manganeso en los tejidos, independientemente de la ingesta del mismo. La absorción y excreción de manganeso se regulan, la absorción ocurre principalmente a través de las rutas de exposición oral y por inhalación, la tasa de absorción en todo el tracto gastrointestinal es variable, usualmente entre 3 a 5% en los seres humanos (ATSDR 2000). Al parecer no existe diferencia en la absorción en todo el tracto gastrointestinal si el manganeso se consume en los alimentos o en el agua (ATSDR 2000) y podría depender de la edad ya que estudios demuestran una mayor absorción en niños pequeños que en adultos. Los niveles alimenticios del hierro también influyen la absorción de manganeso, ya que niveles bajos de hierro originan un aumento de la absorción de manganeso. El metabolismo del manganeso no se conoce muy bien en sistemas humanos, pero al parecer involucra a la oxidación del manganeso Mn(II) a Mn(III). La excreción ocurre principalmente mediante la bilis, aunque otras rutas de eliminación incluyen la orina, la leche materna y el sudor, el manganeso se elimina de la sangre mediante el hígado, en donde se conjuga con bilis y se excreta al intestino y se elimina con las heces.

#### **Exposición por Inhalación**

Los pulmones y el tracto gastrointestinal pueden absorber el manganeso luego de la inhalación de su polvo, sin embargo no se conocen las tasas relativas de absorción (ATSDR 2000).

#### **Exposición Dérmica**

Se espera que la absorción de manganeso a través de piel intacta sea extremadamente limitada (ATSDR 2000).

### **Toxicidad**

#### **Efectos no Cancerígenos**

#### **Exposición Oral**

El manganeso es un elemento esencial para los seres humanos y se encuentra extensamente en todo el cuerpo, los efectos adversos para la salud se pueden vincular tanto con la deficiencia como con el exceso de manganeso. El manganeso se requiere para la mineralización ósea, el metabolismo de proteínas y de la energía, la regulación metabólica y la protección celular frente a los radicales libres. El manganeso es

también un componente de metaloenzimas y puede actuar como un activador enzimático (ATSDR 2000).

#### Exposición por Inhalación

La exposición crónica a altos niveles de manganeso ha causado daños neurológicos permanentes en mineros expuestos a nivel ocupacional (ATSDR 2000). Las exposiciones crónicas a concentraciones de manganeso más bajas han originado la pérdida de coordinación y del equilibrio, así como la disminución de la capacidad de realizar movimientos rápidos con la mano (ATSDR 2000). La inhalación que contiene material particulado pudiera originar también una respuesta inflamatoria en los pulmones (ATSDR 2000).

#### Exposición Dérmica

Se ha descubierto que las formas orgánicas de manganeso (maneb y mancozeb) causan reacciones alérgicas de dermatitis por contacto.

#### Dosis Referencial para la Exposición Oral Crónica (DR)

*Health Canada* (2009) desarrolló una ingesta diaria tolerable para el manganeso de 0.1 mg/kg/día para niños pequeños receptores y 0.2 mg/kg/día para adultos receptores.

USEPA desarrolló una DR de 0.14 mg/kg/día basada en una recopilación de evaluaciones de ingestas alimenticias de manganeso típicas. En 1989 la Comisión Americana de Alimentos y Nutrición del Consejo Nacional de Investigación (NRC) determinó una ingesta alimenticia diaria segura estimada de 2 a 5 mg/día e indicó que una ingesta ocasional de 10 mg/día podría ser segura. Posteriormente algunos nutricionistas han indicado que el nivel del NRC de 2 a 5 mg/día pudiera ser demasiado bajo de acuerdo a recientes cambios en la dieta que incluyen un mayor consumo de carnes y alimentos procesados y menos granos enteros, y recomendaron niveles de 3.5 a 7 mg/día para evitar niveles de manganeso por debajo del nivel óptimo en la población (USEPA 2004). La Organización Mundial de la Salud también examinó los niveles de manganeso en la dieta de los adultos y el promedio diario varía de 2.0 a 8.8 mg/día. La Organización Mundial de la Salud llevó a cabo estudios sobre el equilibrio del manganeso y encontró que 2 a 3 mg/día es adecuado y que 8 a 9 mg/día es "seguro" para poblaciones de adultos (USEPA 2004). Generalmente las concentraciones altas de manganeso en la dieta se asocian con un alto consumo de cereales de grano entero, nueces, verduras de hojas verdes y té. Es importante indicar que la biodisponibilidad del manganeso en dietas vegetarianas es menor que en dietas no vegetarianas debido a la formación de complejos insolubles en los intestinos (USEPA 2004). Otros estudios indican que las dietas típicas en los Estados Unidos, Inglaterra y Holanda contienen concentraciones de manganeso de 2.3 a 8.8 mg/día. Tomando como base una recopilación de estudios en seres humanos, USEPA

recomienda el uso de 10 mg/día como NOAEL crónico. La DR corresponde a 0.14 mg/kg/día según una corrección para un adulto de 70 kg. Se aplicó un factor de incertidumbre de 1 al NOAEL crónico debido a que el NOAEL se derivó de una muestra representativa de muchas poblaciones grandes de seres humanos y a que el manganeso es un elemento esencial.

Un estudio epidemiológico del manganeso en el agua potable y en la dieta de tres áreas al noroeste de Grecia demostró efectos neurológicos en poblaciones expuestas al manganeso, sin embargo la cantidad exacta en el agua y la dieta no se pudo cuantificar, imposibilitando con ello el desarrollo de una relación cuantitativa dosis-respuesta. Las concentraciones estimadas de manganeso en la dieta y el agua fluctúan entre los 5 y 15 mg/día (USEPA 2004). Debido a la posibilidad de que existan efectos neurológicos con concentraciones de manganeso cercadas al NOAEL crónico, USEPA también recomienda sustraer la ingesta alimenticia básica de manganeso (5 mg/día; USEPA Region 9 2002) de la DR y utilizar un factor de modificación de tres cuando se realicen evaluaciones de riesgo con fuentes de manganeso no alimenticias (es decir manganeso en la tierra o en el agua potable). La substracción del manganeso alimenticio básico y el uso de un factor de modificación de tres resultan en una DR de 0.024 mg/kg/día.

La Organización Mundial de la Salud dedujo una ingesta diaria tolerable (IDT) de 0.06 mg/kg del peso corporal para el manganeso, según estudios sobre la dieta de los seres humanos en donde un valor máximo de 11 mg/día para la ingesta se consideró como un NOAEL. El NOAEL de 11 mg/día dividió por un factor de incertidumbre de 3 (para permitir el posible aumento de la biodisponibilidad del manganeso derivado del agua) y por un peso corporal adulto de 60 kg (OMS 2004; 2008).

#### Concentración Referencial para la Exposición Crónica por Inhalación (CR)

USEPA desarrolló una CR de  $5E-5$  mg/m<sup>3</sup> para el manganeso, tomando como base la disminución de la función neuroconductual descubierta en hombres en Bélgica expuestos en forma ocupacional al polvo de dióxido de manganeso en una fábrica de baterías. Dicha disminución involucró un tiempo de reacción visual significativamente más lento y el control errático del movimiento mano-antebrazo en la población expuesta en forma ocupacional en comparación con los sujetos de control. Los trabajadores de la fábrica se expusieron a una concentración de polvo respirable integrado (PRI), que se calculó multiplicando exposiciones ocupacionales con un promedio de tiempo ponderado de 8 horas para varias clasificaciones de trabajo por el número de años que las personas habían trabajado en la fábrica. Se determinó un LOAEL de 0.15 mg/m<sup>3</sup> dividiendo la media métrica geométrica del PRI por la duración promedio de la exposición de los trabajadores, se ajustó el LOAEL (HEC) para una exposición continua (es decir, en lugar de 5 días de trabajo/semana) y es 0.05 mg/m<sup>3</sup>. Se evaluó muchos otros estudios ocupacionales y se calcularon valores de LOAEL más bajos, sin

embargo la exposición al manganeso en otros estudios ocupacionales corresponde al resultado de una mezcla desconocida de compuestos de manganeso y las concentraciones variaron con el tiempo; por lo que USEPA decidió utilizar un LOAEL de  $0.05 \text{ mg/m}^3$  con el fin de deducir una CR para el manganeso.

Se aplicó un factor de incertidumbre de 1000 al LOAEL para entonces deducir una CR de  $5\text{E-}5 \text{ mg/m}^3$ . El factor de incertidumbre se compone de: un factor de 10 para representar las sub-poblaciones sensibles, un factor de 10 para representar el uso de un LOAEL y así establecer la CR y un factor de 10 para representar las limitaciones de la base de datos que reflejen la exposición no crónica, la falta de datos de desarrollo y las diferencias no cuantificadas en la toxicidad de diferentes formas de manganeso (USEPA 2004). La confianza en la CR es media, reflejándose la confianza media en el estudio principal y la base de datos.

#### Efectos Cancerígenos

*Health Canada* (1996) no ha evaluado la carcinogenicidad del manganeso.

USEPA clasificó al manganeso como un cancerígeno del grupo D, es decir no clasificable en cuanto a la carcinogenicidad para los seres humanos debido a la falta de datos referentes a seres humanos y datos inadecuados de estudios con animales. Se realizaron varios estudios con roedores, sin embargo ninguno de los animales desarrolló un aumento significativo en el número de tumores después de la administración del manganeso en comparación con los controles o en un caso, la evidencia de una relación con la dosis se consideró marginal. Actualmente no se dispone de estimados cuantitativos para los factores de la pendiente o los valores de riesgo unitario.

#### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de un factor de pendiente oral para el manganeso (*Health Canada* 2004, USEPA 2004).

#### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de un factor de pendiente de inhalación para el manganeso (USEPA 2004).

## Resumen

|                                   |                        |                      |            |
|-----------------------------------|------------------------|----------------------|------------|
| IDT oral                          | 0.06 mg/kg/día         | derivada del NOAEL   | OMS 2008   |
| CR por inhalación                 | 5E-5 mg/m <sup>3</sup> | daño neuroconductual | USEPA 2004 |
| factor de pendiente oral          | no disponible          |                      | USEPA 2004 |
| factor de pendiente de inhalación | no disponible          |                      | USEPA 2004 |

\* USEPA recomienda sustraer la ingesta alimenticia básica de manganeso y utilizar un factor de modificación de tres cuando se evalúan fuentes de manganeso no alimenticias, dando como resultado una DR modificada de 0.024 mg/kg/día.

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## **Mercurio**

### ***Farmacocinética***

#### Exposición Oral

Las principales fuentes de exposición al mercurio para la población en general son el consumo de pescado, que contiene metilmercurio, y la liberación del mercurio elemental de los empastes dentales (ATSDR 1999). Los datos de seres humanos y animales generalmente se limitan a la exposición por inhalación de vapores de mercurio metálico y a la exposición oral a compuestos de mercurio inorgánico y orgánico. El mercurio metálico es altamente lipofílico y se difumina rápidamente en la sangre hacia los principales órganos objetivos tales como la sangre, el cabello, los dientes, los riñones, el cerebro, los pulmones, el hígado y el bazo (ATSDR 1999). La ingesta de cantidades pequeñas de mercurio metálico como el volumen encontrado en un termómetro estándar (aproximadamente 0.1 mL o 1 g) no produce síntomas de intoxicación (ATSDR 1999), los informes sobre la ingesta de cantidades sustanciales de mercurio elemental indican que la absorción es insignificante (<0.01%) (ATSDR 1999). Cierta cantidad de estudios con animales indica una absorción oral de mercurio inorgánico en un rango de 10 a 30% y la tasa en ratas y ratones depende de diversos factores (por ejemplo pH intestinal, disociación de compuestos, edad y dieta). En estudios con animales el mercurio inorgánico tiende a distribuirse al hígado y a los riñones, también se encontraron cantidades más pequeñas en el cerebro y la retención fue más prolongada en este tejido. A pesar de que los compuestos de mercurio inorgánico no se transfieren con facilidad de la sangre de una mujer embarazada al feto, existe una transferencia eficiente de mercurio inorgánico de la sangre a la leche materna. Luego de la exposición al mercurio metálico, la eliminación puede ocurrir mediante la orina, las heces y el aire respirado.

Los compuestos de mercurio orgánico se absorben con más facilidad por exposición oral que los compuestos de mercurio inorgánico, siendo el metilmercurio el que se absorbe con más facilidad a través del tracto gastrointestinal (ATSDR 1999). La absorción y biodisponibilidad del metilmercurio en los alimentos, específicamente en los pescados y en el pan, se pueden afectar por otros componentes alimenticios. El metilmercurio se distribuye rápidamente a todos los tejidos, incluyendo el cerebro y el feto, y los niveles más altos se encuentran en los riñones, también se puede secretar en la leche materna. La desmetilación ocurre en el cerebro, así como en otros órganos, incluyendo los riñones y el hígado, y pudiera contribuir sustancialmente a las altas concentraciones de mercurio inorgánico en el cerebro. Los compuestos de mercurio orgánico se excretan principalmente mediante las heces en los seres humanos.



### Exposición por Inhalación

La retención de mercurio después de la exposición al vapor de mercurio elemental liberado del mercurio líquido es de aproximadamente 70 a 80% en tejidos humanos. No se encontraron estudios sobre la absorción de compuestos de mercurio orgánico (por ejemplo fenilmercurio o metilmercurio) en seres humanos o animales mediante exposición por inhalación.

### Exposición Dérmica

La absorción dérmica de vapor de mercurio metálico representa un peligro ocupacional muy bajo en comparación con la exposición por inhalación (ATSDR 1999). Se estima que la ruta dérmica absorbe aproximadamente el 2.6% de la cantidad absorbida por el pulmón. No se encontró información disponible sobre la absorción dérmica del mercurio metálico líquido, pero a menos que la superficie de la piel esté dañada, se espera que sea mínima (ATSDR 1999). La absorción dérmica de la especie de dialquil mercurio es casi completa (es decir 100%).

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

##### *Mercurio Orgánico e Inorgánico*

Los principales órganos, objetivo de la toxicidad después de la exposición oral a mercurio inorgánico y orgánico son los riñones y el sistema nervioso central, respectivamente. Los principales efectos del mercurio orgánico en el sistema nervioso central incluyen alteraciones motoras y disfunción sensorial, en el área de Minamata en Japón y en Irak se reportó un brote general de trastornos neurológicos asociados con la ingesta de metilmercurio (ATSDR 1999) y los síndromes neurológicos observados en estas poblaciones altamente expuestas incluyen sensación de hormigueo en las extremidades, daños en la visión periférica, audición, gusto y olfato, problemas de dicción, debilidad muscular; irritabilidad, pérdida de la memoria, depresión y dificultades para dormir. La exposición prenatal al metilmercurio en roedores ha demostrado causar retrasos en el desarrollo y daños en la función motora.

### Exposición por Inhalación

##### *Mercurio Metálico*

Los síntomas reportados con mayor frecuencia después de la exposición a vapores de mercurio metálico en altas concentraciones incluyen tos, disnea y rigidez o quemazón en el pecho (ATSDR 1999), en casos más graves se observa malestar respiratorio, edema pulmonar y neumonía. Otros órganos objetivo principales para la toxicidad inducida por inhalación de mercurio metálico son los riñones, el sistema nervioso central y el sistema gastrointestinal. Los conejos expuestos al vapor de mercurio durante diferentes periodos de tiempo demuestran efectos neurológicos como

temblores, irritabilidad, nerviosismo, insomnio, pérdida de memoria, cambios neuromusculares, dolores de cabeza, polineuropatía y déficits de desempeño en pruebas de la función cognitiva.

#### *Mercurio Orgánico e Inorgánico*

La exposición al mercurio orgánico por inhalación es extremadamente rara, sin embargo en un granjero que había manejado grano con cantidades desconocidas de acetato de fenilmercurio; se observó disnea, depresión respiratoria y respiraciones frecuentemente obstruidas por mucosidad (ATSDR 1999). En varios estudios de casos con seres humanos expuestos a compuestos de mercurio orgánico, se reportan efectos gastrointestinales, similares a los observados por la exposición a mercurio metálico,

#### Exposición Dérmica

La exposición ocupacional aguda y crónica a mercurio inorgánico originó dermatitis por contacto (ATSDR 1999), la aplicación de ungüento con mercurio amoniacal en la piel en niños originó picazón, rubefacción, hinchazón y conjuntivitis, una mujer expuesta a aplicaciones tópicas de una crema que contenía 17.5% de cloruro de amonio mercurico durante 18 años mostró temblores leves, ansiedad y depresión. La exposición dérmica a metilmercurio o fenilmercurio en seres humanos pudiera causar erupciones y ampollas en la piel (ATSDR 1999).

#### Ingesta Diaria Tolerables (IDT) y Dosis Referencial (DR) para la Exposición Crónica Oral

No se dispone de una DR de USEPA para exposición oral crónica a mercurio elemental (USEPA 2004), sin embargo USEPA (2004) desarrolló una DR por cloruro mercurico de  $3E-4$  mg/kg/día, según los resultados de varios estudios realizados con ratas (estudios subcutáneos y alimentación) que se utilizaron para recomendar un nivel equivalente en agua potable (0.010 mg/L). Posteriormente el nivel equivalente en agua potable se utilizó para volver a calcular una concentración con dosis referencial tomando como base una tasa de ingesta de agua potable de 2L al día y un peso corporal adulto de 70 kg. Se aplicó un factor de incertidumbre de 1000 al LOAEL deducido a partir de estudios con ratas, incluyendo (1) un factor de 10 por el uso de ratas marrones de Noruega en el estudio, (2) un factor de 10 por el uso de un LOAEL en lugar de un NOAEL para deducir la DR y (3) un factor de 10 para representar el uso de estudios subcrónicos, la extrapolación interespecies y las poblaciones humanas sensibles. La confianza en la base de datos y la DR es alta.

Para *Health Canada*, la ingesta oral diaria tolerable de mercurio inorgánico corresponde a  $3E-4$  mg/kg del peso corporal/día y se basa directamente en la DR para cloruro mercurico desarrollada por USEPA (CCME 1999).

La Organización Mundial de la Salud dedujo una ingesta diaria tolerable (IDT) de 2 µg/kg del peso corporal para el mercurio inorgánico (OMS 2000). La IDT se basó en un estudio realizado durante 26 semanas en donde se determinó un NOAEL de 0.23 mg/kg del peso corporal al día para los efectos renales en ratas. El valor se ajustó para una dosis de 5 días por semana y se aplicó un factor de incertidumbre de 100 (variación interespecies e intraespecies).

#### Concentración Tolerable (CT) y Concentración Referencial (CR) para la Exposición Crónica por Inhalación

La CR para mercurio elemental es  $3\text{E-}4 \text{ mg/m}^3$  y se basa en diversos estudios sobre inhalación ocupacional en seres humanos enfocados en la ocurrencia de temblores en las manos, aumento de trastornos de la memoria y evidencia de disfunción autonómica como puntos finales de efectos críticos. Se determinó un LOAEL de  $0.025 \text{ mg/m}^3$  tomando como base concentraciones por exposición promedio de aproximadamente  $0.025\text{-}0.03 \text{ mg/m}^3$ , durante un periodo de unos 15 años. El LOAEL se basa en una exposición ocupacional con una concentración en el aire y un promedio de tiempo ponderado de 8 horas y extrapolación a partir de los niveles sanguíneos. La CR contiene un factor de incertidumbre de 30, el cual incluye un factor de 10 debido a la protección de las sub-poblaciones humanas sensibles y el uso de un LOAEL en lugar de un NOAEL y un factor de 3 debido a la falta de desarrollo y a los estudios reproductivos en la base de datos.

#### Efectos Cancerígenos

*Health* Canada no ha clasificado la carcinogenicidad del mercurio inorgánico (CCME 1999).

El mercurio elemental se clasifica como un cancerígeno del grupo D, es decir no clasificable debido a la existencia de datos inadecuados con respecto a los seres humanos y animales, según los datos inadecuados existentes con respecto a los seres humanos y animales. Los estudios epidemiológicos se limitan a la presencia de factores que inducen a confusión y a las exposiciones concomitantes a múltiples químicos y no se ha demostrado una correlación entre la exposición al vapor de mercurio elemental y la carcinogenicidad.

USEPA clasifica al cloruro de mercurio como un cancerígeno del grupo C, es decir posible agente cancerígeno para los seres humanos, debido a la falta de datos con respecto a los seres humanos y a la limitada evidencia en roedores (USEPA 2004).

#### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de una dosis tumorigénica para el mercurio inorgánico ni factores de la pendiente oral para el mercurio elemental y el cloruro de mercurio por parte de *Health*

Canada y USEPA, ya que los datos sobre carcinogenicidad en seres humanos y animales se consideran limitados o inadecuados (*Health Canada* 2004, USEPA 2004).

#### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de una concentración tumorigena para el mercurio inorgánico ni factores de la pendiente de inhalación para el mercurio elemental y el cloruro de mercurio por parte de *Health Canada* y USEPA, ya que los datos sobre carcinogenicidad en seres humanos y animales se consideran limitados o inadecuados (*Health Canada*, 2004; USEPA, 2004).

#### **Resumen**

|                                              |                           |                      |            |
|----------------------------------------------|---------------------------|----------------------|------------|
| IDT oral (Hg inorgánico)                     | 0.002 mg/kg/día           | efectos renales      | OMS 2008   |
| Concentración tolerable (HgCl <sub>2</sub> ) | 0.00006 mg/m <sup>3</sup> |                      | HC 2009    |
| CR por inhalación (Hg)                       | 3E-4 mg/m <sup>3</sup>    | efectos neurológicos | USEPA 2004 |
| factor de pendiente oral                     | no disponible             |                      | USEPA 2004 |
| factor de pendiente de inhalación            | no disponible             |                      | USEPA 2004 |

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## ***Molibdeno***

### **Farmacocinética**

#### Exposición Oral, Dérmica y por Inhalación

Actualmente no se dispone de información farmacocinética para el molibdeno.

### **Toxicidad**

#### Exposición no Cancerígena

#### Exposición Oral, Dérmica y por Inhalación

Actualmente no se dispone de información sobre la toxicidad no cancerígena en general para el molibdeno.

#### Ingesta Diaria Tolerable (IDT) y Dosis Referencial (DR) para la Exposición Oral Crónica

Para la ingesta diaria tolerable oral del molibdeno existe un valor de 0.023 mg/kg/día para niños pequeños y de 0.028 mg/kg/día para adultos establecida por Health Canada (Health Canada 2009).

USEPA (2004) desarrolló una dosis referencial para la exposición crónica oral al molibdeno de 5E-3 mg/kg/día, a partir de un estudio con una exposición alimenticia en seres humanos durante 6 años o de por vida la cual se enfocó en el aumento de los niveles de ácido úrico en el torrente sanguíneo como un efecto crítico (USEPA 2004). No se estableció un NOAEL, pero el valor del LOAEL corresponde a 0.14 mg/kg/día. El factor de incertidumbre general de 30 se compone por un factor de 3 debido a la protección de sub-poblaciones sensibles y un factor de 10 por el uso de un LOAEL de un estudio con una exposición de seres humanos por largo tiempo. La confianza general en la DR es media debido al uso de un estudio principal basado en un examen de los efectos físicos únicamente generales de una enfermedad tipo gota, con un análisis parcial de la química de la sangre para parámetros normalmente asociados con la gota y no con un análisis exhaustivo (USEPA 2004).

#### *Concentración tolerable (CT) y concentración referencial (CR) debido a una exposición crónica por inhalación*

No se dispone de un valor para la concentración por inhalación tolerable de molibdeno establecida por Health Canada (Health Canada 2009).

Actualmente no se dispone de un valor de CR por parte de USEPA para el molibdeno (USEPA 2004).

RIVM (2001) estableció una concentración tolerable en aire (CTA) de 0.012 mg/m<sup>3</sup>, basada en estudios por inhalación semi-crónica en ratas y ratones. La CTA se derivó

de acuerdo a un NOAEC ajustado de 12 mg/m<sup>3</sup> con un factor de seguridad de 1000 con el fin de representar la variabilidad interespecies e intraespecies y la extrapolación de una exposición semi-crónica a crónica.

### Efectos Cancerígenos

*Health Canada* (1993) y USEPA (2004) no han clasificado al molibdeno en cuanto a su carcinogenicidad en seres humanos.

### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de una dosis tumorigénica (DT<sub>05</sub>) ni un factor de pendiente oral para el molibdeno por parte de *Health Canada* (2009) o USEPA (2004).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de una concentración tumorigénica (CT<sub>05</sub>) ni un factor de pendiente de inhalación para el molibdeno por parte de *Health Canada* (2009) o USEPA (2004).

### **Resumen**

|                                   |                         |                                     |                           |
|-----------------------------------|-------------------------|-------------------------------------|---------------------------|
| DR oral crónica                   | 5E-3 mg/kg/día          | aumento de ácido úrico en la sangre | USEPA 2004                |
| concentración tolerable           | no disponible           |                                     | <i>Health Canada</i> 2009 |
| CTA por inhalación                | 0.012 mg/m <sup>3</sup> |                                     | RIVM 2001                 |
| dosis tumorigena                  | no disponible           |                                     | Health Canada 1996        |
| factor de pendiente oral          | no disponible           |                                     | USEPA 2004                |
| concentración tumorigena          | no disponible           |                                     | Health Canada 1996        |
| factor de pendiente de inhalación | no disponible           |                                     | USEPA 2004                |

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## **Níquel**

### **Farmacocinética**

#### Exposición Oral

Estudios examinaron la absorción de níquel en seres humanos y encontraron que el sulfato de níquel es 40 veces más biodisponible si es administrado en agua en lugar de junto con la ingesta de alimentos (ATSDR 1997), la biodisponibilidad del níquel también aumenta cuando se administra en un refresco, pero no cuando se administra con leche, café, té o jugo de naranja (ATSDR 1997). Se encontró que los niveles de níquel en suero son elevados en sujetos que no habían ingerido alimentos antes de la administración del níquel en agua potable, sin embargo esto no ocurría en personas que recibían níquel en los alimentos, debido a que los mismos tienden a reducir la biodisponibilidad del níquel. Se descubrió que en algunas personas sensibles al níquel las concentraciones de suero se habían reducido y las concentraciones de níquel en la orina habían aumentado con mayores concentraciones de níquel administrado (ATSDR 1997). Esto pudiera ser una indicación de que algunas personas sensibles al níquel reducen su absorción como respuesta al aumento de la ingesta de níquel. La mayor parte del níquel se excreta por las heces, aunque el absorbido por el tracto gastrointestinal se excreta en la orina y en estudios comparativos de dosis de níquel administrada en alimentos o agua, el 26% de la dosis administrada en agua se eliminó en la orina y el 76% en las heces en el cuarto días después de la administración (ATSDR 1997). Por el contrario el 2% de la dosis de níquel administrada en los alimentos se eliminó en la orina y el 102% en las heces durante el mismo periodo de tiempo. El níquel también se puede eliminar a través del cabello, el sudor, la leche y la piel.

#### Exposición por Inhalación

Luego de una exposición por inhalación, el níquel tiende a acumularse en los pulmones y la absorción del tracto respiratorio depende de la solubilidad del compuesto de níquel. La exposición ocupacional origina mayores cargas de níquel en los pulmones que en la población en general. Las personas sensibles al níquel presentan niveles de níquel similares en sangre, orina y cabello en relación con las personas no sensibles. El níquel inhalado se excreta a través de la orina. Estudios realizados en personas que trabajan con níquel muestran que la excreción del níquel en la orina aumenta al final del turno y también al final de la semana de trabajo, lo que indica que una fracción se elimina rápidamente y una segunda fracción se elimina lentamente. En personas no expuestas de manera ocupacional, las concentraciones de níquel tienden a ser más altas en los pulmones, la tiroides y las glándulas adrenales, los riñones, el corazón y el hígado.

### Exposición Dérmica

No se encontraron estudios sobre la excreción del níquel en seres humanos o animales después de una exposición dérmica al níquel.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

Se reportaron efectos gastrointestinales posteriores a la ingestión agua proveniente de una fuente que contenía sulfato de níquel y cloruro de níquel por parte de trabajadores (ATSDR 1997). Las dosis de exposición variaron entre 7.1 a 35.7 mg/kg y los síntomas incluyen náuseas, dolor abdominal, vómitos y diarrea; también se observaron efectos neurológicos en los trabajadores afectados. El asma se puede presentar en un pequeño número de personas sensibilizadas, sin embargo también se demostró que la exposición oral continuada al níquel desensibiliza a algunas personas y evita la sensibilización en otros casos (ATSDR 1997). Según estudios realizados con animales, se recomienda una dosis alimenticia mínima de níquel en la dieta de 50 µg/kg (ATSDR 1997). La ingesta alimenticia promedio de níquel para las poblaciones de los Estados Unidos es de aproximadamente 150 a 168 µg/día (personas de 70 kg), de manera que no se espera que la deficiencia de níquel afecte a la población en general (ATSDR 1997).

#### Exposición por Inhalación

Los únicos datos disponibles sobre la exposición por inhalación crónica de níquel en seres humanos se limita a datos ocupacionales. Una de las limitaciones asociadas con los datos epidemiológicos disponibles es que los trabajadores se expusieron a diversas formas diferentes de níquel al igual que a otros metales y gases irritantes al mismo tiempo, de manera que con frecuencia los efectos observados no se pueden atribuir a un tipo particular de níquel y en algunos casos al níquel en general, si también se utilizan otros metales en los procesos de refinado, minado o fundición (ATSDR 1997). Otros factores relacionados con el estilo de vida como el tabaquismo, que afecta los resultados de una enfermedad, no siempre están disponibles, lo que limita las conclusiones que se puedan extraer. Los efectos respiratorios encontrados en las personas que trabajaban con níquel incluyeron bronquitis crónica, enfisema y reducción de la capacidad vital, estos trabajadores también se expusieron a otros metales, de manera que no se puede concluir que el níquel sea el único agente causante de los efectos observados. También se ha documentado la ocurrencia de asma a partir de una irritación primaria, como resultado de la sensibilización dérmica entre las personas que trabajaban con níquel. Los trabajadores de la fundición de níquel con concentraciones elevadas del mismo en la orina también mostraron un aumento significativo en los niveles de  $\beta_2$ -microglobulina urinaria, lo cual es indicativo de disfunción tubular en los riñones (ATSDR 1997).

### Exposición Dérmica

La dermatitis causada por níquel es el efecto más prevalente de níquel y ocurre en personas sensibles al mismo (ATSDR 1997). La sensibilización de níquel se origina a raíz del contacto extenso con materiales que lo contienen tales como joyas, monedas, correctores dentales, acero inoxidable, etc. El contacto causado por la exposición ocupacional también puede producir dermatitis. Una vez que una persona se convierte sensible al níquel, la siguiente exposición (mediante inhalación, ingesta o contacto dérmico) inclusive a niveles bajos pudiera causar reacción. Las poblaciones que son inusualmente susceptibles al níquel son aquellas que ya son sensibles debido al contacto prolongado y las siguientes exposiciones podrían originar una reacción alérgica. Las mujeres tienden a ser más sensibles al níquel que los hombres y se relaciona con el hecho de que ellas por lo general utilizan más joyería de metal que los hombres; se requiere el desarrollo de estudios más detallados con el fin de determinar si en realidad existe una diferencia de género en cuanto a la sensibilidad al níquel se refiere. También es probable que las personas con disfunción renal sean más susceptibles debido a que la ruta principal de eliminación del níquel es la orina.

### Dosis Referencial para la Exposición Oral Crónica (DR)

*Health Canada* desarrolló un valor de 0.0013 mg/kg/día para la ingesta diaria tolerable de cloruro de níquel (*Health Canada* 2009). No se dispone del informe de soporte.

La DR para sales solubles de níquel es 2E-2 mg/kg/día (los efectos críticos incluyen la disminución del peso corporal y el peso de los órganos) (USEPA 2006).

La Organización Mundial de la Salud dedujo una ingesta diaria tolerable (IDT) de 12 µg/kg del peso corporal para el níquel (OMS 2005, 2008). Esta IDT se dedujo a partir de un LOAEL, que a su vez se determinó a partir de un estudio en donde pacientes en ayunas con el estómago vacío experimentaron una provocación oral. El cálculo de LOAEL supone la exposición total al agua potable, es aquí importante mencionar el hecho de que la absorción en el agua potable con el estómago vacío es 10 a 40 veces más alta que la absorción en los alimentos (OMS 2008), debido a que la presencia de agua o alimentos en el estómago normalmente reduciría significativamente dicha absorción y en consecuencia la OMS no aplicó ningún factor de seguridad en la deducción del IDT ya que el LOAEL se dedujo de una población humana altamente sensible.

### Concentración Referencial para la Exposición por Inhalación Crónica (CR)

*Health Canada* (2009) publicó una CR por inhalación de 0.000018 mg/m<sup>3</sup> para el níquel metálico.

No se dispone de una CR para sales solubles de níquel (USEPA 2006).

### Efectos Cancerígenos

*Health Canada* clasificó al níquel metálico en el grupo IV (no clasificable como cancerígeno para los seres humanos) y al níquel soluble en el grupo 1 (cancerígeno para los seres humanos) (*Health Canada* 1994).

USEPA no ha evaluado la carcinogenicidad de las sales solubles de níquel.

El polvo de las fundiciones de níquel se clasifica en el grupo A, es decir cancerígeno para los seres humanos según datos sobre seres humanos los cuales indican que la exposición al polvo de fundiciones de níquel causó tumores pulmonares y nasales en trabajadores de fundiciones incluidos en varios estudios epidemiológicos y también datos sobre animales que indican la producción de carcinomas en ratas por inhalación e inyección. El níquel administrado en forma de carbonilo de níquel se fija al ADN y se clasifica en el grupo B2, es decir probable cancerígeno para los seres humanos según la observación de carcinomas pulmonares y tumores malignos en ratas a las que se administró carbonilo de níquel por inhalación e inyección intravenosa, respectivamente. El subsulfuro de níquel se encuentra en el grupo A, es decir cancerígeno para los seres humanos tomando como base el aumento de los riesgos de desarrollar cáncer pulmonar y nasal en seres humanos expuestos al polvo de fundiciones de níquel, la mayor parte del cual se cree que es subsulfuro de níquel, el aumento de las incidencias de tumores en animales mediante distintas rutas de administración en varias especies de animales y cepas y los resultados positivos en ensayos sobre genotoxicidad.

### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de un factor de pendiente oral para ningún compuesto de níquel (USEPA 2006).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

*Health Canada* desarrolló un factor de pendiente de inhalación de  $5.5 \text{ (mg/kg/día)}^{-1}$  para el níquel soluble basado en el aumento en la incidencia de cáncer pulmonar en trabajadores expuestos en forma ocupacional (cohorte de Kristiansand 1990, según se cita en *Health Canada* 2003)

No se dispone de un factor de pendiente de inhalación para sales solubles de níquel (USEPA 2006). Sin embargo el riesgo unitario por inhalación para el polvo de fundiciones de níquel corresponde a  $2.4\text{E-}4$  per  $(\mu\text{g}/\text{m}^3)$  y para el subsulfuro de níquel es  $4.8\text{E-}4$  per  $(\mu\text{g}/\text{m}^3)$ . Ambos riesgos unitarios consideran estudios epidemiológicos de cáncer pulmonar y datos sobre carcinomas en animales.

La Organización Mundial de la Salud (OMS, 2000) derivó un riesgo unitario por inhalación basado en un estudio de poblaciones humanas expuestas de manera ocupacional susceptibles al cáncer de pulmón y no se pudo recomendar un nivel seguro para los compuestos de níquel asumiendo una respuesta lineal de la dosis. Según la información sobre la exposición y el riesgo estimado en poblaciones industriales, la OMS determinó un riesgo incremental de  $3.8 \times 10^{-4}$  para una concentración de níquel de  $1 \mu\text{g}/\text{m}^3$  en el aire (OMS 2000).

### Resumen

|                                |                                    |                  |             |
|--------------------------------|------------------------------------|------------------|-------------|
| IDT oral                       | 12 mg/kg/día                       | provocación oral | OMS 2008    |
| CR por inhalación              | no disponible                      |                  | US EPA 2004 |
| factor de pendiente oral       | no disponible                      |                  | US EPA 2004 |
| riesgo unitario por inhalación | $0.38 (\text{mg}/\text{m}^3)^{-1}$ | cáncer de pulmón | OMS 2000    |

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## **Selenio**

### **Farmacocinética**

#### Exposición Oral

Estudios con seres humanos y animales revelan que el selenio en forma de selenita, seleniato y selenometionina se absorbe al ingerirlo a través del tracto gastrointestinal en más del 80% de la dosis administrada (ATSDR 2003). Posterior a la absorción el selenio se acumula en diversos sistemas orgánicos, encontrándose las concentraciones más altas en el hígado y los riñones, aunque los niveles de concentración en los tejidos no se correlacionan con los niveles de los efectos (ATSDR 2003). El selenio es un micronutriente esencial en seres humanos, es un componente de la sangre, el cabello y las uñas y se ha encontrado en la leche humana; se conoce también que se transfiere a través de la placenta. El exceso de selenio ingerido en forma de selenita y seleniato se metaboliza en compuestos metilados y excretados. Su eliminación ocurre a través de la orina y las heces en seres humanos y animales y la distribución entre las dos rutas varía según el nivel de exposición y el tiempo transcurrido después de la exposición (ATSDR 2003). La forma del selenio excretado depende de la forma en la que se ingirió y en el caso de exposición aguda a concentraciones tóxicas de selenio o sus compuestos, se excretan cantidades significativas mediante la exhalación de aire o el sudor en menor proporción.

#### Exposición por Inhalación

No se han realizado estudios cuantitativos con el fin de calcular la tasa de absorción del selenio elemental o de sus compuestos en seres humanos, aunque estudios ocupacionales demuestran que estas formas se absorben (ATSDR 2003). En estudios con perros y ratas se reporta que la absorción del selenio después de una exposición por inhalación es extensa, sin embargo no se dispone de estudios sobre dicha distribución en seres humanos; aunque un estudio con perros encontró absorción del selenio después de exposición a ácido selenioso y selenio elemental en forma de aerosol en el hígado, los riñones, el bazo y los pulmones (ATSDR 2003). La excreción de selenio después de una exposición por inhalación en seres humanos se realiza en el aire exhalado.

#### Exposición Dérmica

En un estudio sobre la absorción dérmica del selenio en forma de selenometionina en seres humanos no se detectó absorción transdérmica, aunque con ratones y el mismo compuesto si se encontró evidencia de absorción transdérmica (ATSDR 2003), en este caso los lugares de aplicación no se ocluyeron y la absorción después de la ingestión es posible. A pesar de que la absorción de los sulfuros de selenio no se conoce de manera profunda, se cree que los disulfuros de selenio no se absorben a través de piel

intacta. La distribución de selenio después de una exposición dérmica no se ha descrito en seres humanos, pero se ha demostrado que ocurre en el hígado y la piel de ratones tratados con una loción tópica contentiva de selenometionina (ATSDR 2003). No se dispone de estudios sobre la excreción del selenio en seres humanos o en animales después de una exposición dérmica.

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

La mayor parte de la información sobre la toxicidad de la exposición oral al selenio proviene de estudios con animales que utilizaron selenita, seleniato, sulfuros de selenio y compuestos de selenio orgánico. El ganado que pasta en áreas con altas concentraciones de selenio en la tierra se ha asociado a la “ceguera tambaleante” y a la enfermedad por alcalí, aunque también se pudiera deber a otros compuestos en la vegetación distintos al selenio. Se conoce de casos de envenenamiento accidentales en seres humanos con pocas fatalidades reportadas. En animales los compuestos tóxicos de selenio más agudos ingeridos por vía oral corresponden a la selenita de sodio y el seleniato de sodio (ATSDR 2003). Se ha reportado efectos respiratorios (incluyendo edemas y lesiones pulmonares) en seres humanos y animales así como taquicardia, malestar gastrointestinal (incluyendo náuseas, vómitos, diarrea y dolor abdominal), cambios hematológicos (en hombres), mejoras inmunológicas y linforeticulares y efectos neurológicos (incluyendo dolores de cabeza e irritabilidad) en seres humanos después de la ingestión de selenio (ATSDR 2003).

Estudios sobre la absorción oral encontraron NOAEL para el selenio (forma no especificada) de 1E-3 mg/kg/día en seres humanos después de una ingestión (que causó efectos en el sistema endocrino) hasta 464 mg/kg/día en ratones tratados con sulfuro de selenio y disulfuro de selenio por sonda (con efectos en el sistema respiratorio, cardiovascular, gastrointestinal, musculo-esquelético, hepático, endocrino y dérmico) (ATSDR 2003). Según estudios sobre absorción oral los LOAEL del selenio varían desde 1E-3 mg/kg/día en conejos machos posterior a una exposición por sonda con agua a selenita de sodio (causando una reducción significativa en los niveles de testosterona en suero) hasta 6700 mg/kg/día en ratas machos después de una exposición por sonda a selenio elemental (el valor del DL50).

#### Exposición por Inhalación

No se dispone de estudios sobre muertes de seres humanos después de una exposición por inhalación al selenio, aunque estudios realizados con animales revelan letalidad aguda en conejillos de indias expuestos a seleniuro de hidrógeno (ATSDR 2003). En estudios sobre exposición ocupacional en seres humanos se reporta que posterior a la exposición por inhalación al polvo de selenio o a otros componentes, que



el principal lugar de lesiones corresponde al tracto respiratorio, seguido de los efectos gastrointestinales y cardiovasculares y la irritación de la piel y los ojos (ATSDR 2003). También se describen efectos cardiovasculares (incluyendo shock), gastrointestinales (incluyendo vómitos y náuseas) en seres humanos expuestos al dióxido de selenio durante un incendio. La toxicidad en animales es similar y el tracto respiratorio es también el lugar principal de lesiones posterior a la exposición al polvo de selenio y al seleniuro de hidrógeno.

Estudios sobre la absorción por inhalación en animales de laboratorio encontraron NOAEL para el selenio elemental y el seleniuro de hidrógeno variando desde los 8 mg/m<sup>3</sup> en conejillos de indias (enfocándose en numerosos efectos sistémicos) hasta los 33 mg/m<sup>3</sup> en ratas, conejos y conejillos de indias (ATSDR 2003). Según estudios sobre absorción por inhalación, los LOAEL del selenio oscilaron entre 1 mg/m<sup>3</sup> en conejillos de indias expuestos a seleniuro de hidrógeno (causando la muerte) y los 33 mg/m<sup>3</sup> en ratas, conejillos de indias y conejos expuestos a selenio elemental (causando varios efectos sistémicos).

#### Exposición Dérmica

No se reporta sobre casos de muerte de seres humanos con exposición dérmica al selenio y a sus compuestos, aunque ratones expuestos a 714 mg/kg de sulfuro de selenio murieron en un lapso de 17 aplicaciones (estos lugares de aplicación no se ocluyeron y la ingestión no se pudo descartar (ATSDR 2003). No se dispone de estudios que muestren efectos respiratorios, cardiovasculares, gastrointestinales u otros efectos en seres humanos o animales después de la exposición dérmica al selenio o a sus compuestos, aunque ocurren efectos dérmicos (incluyendo quemaduras, erupciones y dermatitis por contacto) en seres humanos expuestos a vapores de selenio y óxido de selenio. Se reportan efectos oculares (incluyendo dolor severo e irritación ocular y conjuntival, lagrimeo y visión borrosa) en informes anteriores de seres humanos que tuvieron contacto ocular con dióxido de selenio.

#### Dosis Referencial para la Exposición Oral Crónica (DR)

La DR para el selenio y sus compuestos es 5E-3 mg/kg/día basada en un NOAEL de 0.015 mg/kg/día derivada de un estudio epidemiológico de la selenosis clínica en seres humanos (US EPA 2005). Se aplicó un factor de incertidumbre de 3 al NOAEL con el fin de representar a las personas sensibles, no se requirió un factor total de 10 debido a que se ha encontrado NOAEL similares en dos estudios con seres humanos de tamaño moderado. La confianza en el valor de la DR y en la base de datos es alta aunque la confianza en el estudio principal se considera media sobre la base de varias interacciones posibles no documentadas (por ejemplo, ingesta de fluoruro y estado proteico).

### Concentración Referencial para la Exposición por Inhalación Crónica (CR)

No se dispone de una CR por inhalación para el selenio o sus compuestos (US EPA 2005).

### Efectos Cancerígenos

US EPA clasifica al selenio y a los compuestos de selenio en el grupo D, es decir no clasificable como cancerígeno para seres humanos (US EPA 2005). La clasificación se basa en datos inadecuados con respecto a seres humanos y evidencia inadecuada de la carcinogenicidad en animales.

### Riesgo de Desarrollar Cáncer por exposición Oral

La base de datos para la exposición oral al selenio y a sus compuestos se considera inadecuada y no se ha determinado un factor de pendiente oral (US EPA 2005).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

La base de datos para la exposición por inhalación al selenio y a sus compuestos se considera inadecuada y no se ha determinado un factor de pendiente de inhalación (US EPA 2005).

### **Resumen**

|                                    |                |                   |             |
|------------------------------------|----------------|-------------------|-------------|
| DR oral crónica                    | 5E-3 mg/kg/día | selenosis clínica | US EPA 2005 |
| CR por inhalación                  | no disponible  |                   | US EPA 2005 |
| factor de pendiente oral           | no disponible  |                   | US EPA 2005 |
| factor de pendiente por inhalación | no disponible  |                   | US EPA 2005 |

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## **Vanadio**

### **Toxicidad**

#### Efectos no Cancerígenos

##### Exposición Oral

La exposición oral a complejos de vanadilo ( $V^{+4}$ ) y vanadato ( $V^{+5}$ ), usualmente utilizados en estudios toxicológicos, origina una mezcla de complejos de vanadilo y vanadato en el tracto gastrointestinal (USEPA, NCEA 2000). En consecuencia, no existe actualmente una base toxicológica donde se pueda distinguir las relaciones dosis-respuesta para cada forma de compuesto de vanadio (USEPA, NCEA 2000). La exposición oral al vanadio en seres humanos no se caracteriza de forma profunda, aunque en un estudio con voluntarios se encontró que la administración de vanadio entre 0.47 y 1.3 mg/kg de vanadio (en forma de tartrato de vanadilo) en cápsulas durante 45 a 68 días causan calambres intestinales y diarrea, a pesar de que no se utilizaron controles del vehículo y de los compuestos (limitando así la calidad de los datos) (ATSDR 1992). De igual manera se observó que las ratas sufren de diarrea posterior a la recepción de una dosis de vanadio de 50 ppm (forma no especificada). En los experimentos con ratas también se demuestra la presencia de daños leves en los riñones (exhibidos como aumento de la urea en el plasma y leves cambios histológicos) después de 3 meses de exposición a metavanadato sódico (con niveles de hasta 10% de la  $DL_{50}$  oral) y un ligero aumento del peso corporal.

##### Exposición por Inhalación

En estudios ocupacionales con exposición por inhalación al vanadio se encontró irritación respiratoria menor como la principal forma de toxicidad y la formación de mucosidad, tos, respiración sibilante, dolor de pecho, goteo nasal y dolor de garganta como los efectos más comunes (y reversibles) (ATSDR 1992). En un estudio con voluntarios se encontró que 0.06 mg/m<sup>3</sup> de vanadio (en forma de pentaóxido de vanadio) ocasionó tos y formación de mucosidad de 7 a 24 horas posterior a la exposición. El sistema respiratorio es el objetivo principal de la toxicidad del vanadio después de una exposición por inhalación en animales; los monos que respiraron 2.8 mg/m<sup>3</sup> de vanadio (en forma de pentaóxido de vanadio) durante 6 horas mostraron un aumento de la resistencia pulmonar 1 día posterior a la exposición, con un aumento dramático en los leucocitos polimorfonucleares en el fluido broquioalveolar. Trabajadores expuestos en forma crónica a polvo de vanadio demostraron irritación ocular moderada.

##### Exposición Dérmica

No se dispone de estudios sobre la toxicidad del vanadio por exposición dérmica (ATSDR 1992).

### Dosis Referencial para la Exposición Oral Crónica (DR)

*Health Canada* no ha desarrollado una ingesta diaria tolerable para el vanadio (*Health Canada* 2004).

La DR para el pentóxido de vanadio ( $V_2O_5$ ) corresponde a  $9E-3$  mg/kg/día según un NOAEL de 17.85 ppm (ajustado a 0.89 mg/kg/día) (USEPA 1996). El valor se basa en un estudio oral crónico realizado con ratas, arrojando una disminución del contenido de la cistina del cabello como el efecto crítico. Se aplicó un factor de incertidumbre total de 100, con un factor de 10 para la extrapolación interespecies y un factor de 10 para proteger a las poblaciones sensibles. Se reportó que la confianza en la DR oral del pentóxido de vanadio es baja debido a la calidad del estudio, la base de datos y el valor de la DR según la escasez de datos disponibles (USEPA, 1996).

US EPA Región 9 publicó una DR de 0.00504 mg/kg-día para el vanadio, sobre la base de la DR establecida por USEPA IRIS con un ajuste debido a las diferencias en el peso molecular.

ATSDR desarrolló un nivel mínimo de riesgo oral de duración intermedia (NMR) para el vanadio (en forma de metavanadato sódico) de  $3E-3$  mg/kg/día según un nivel sin efectos adversos observados (NOAEL) de 0.3 mg/kg/día para efectos renales y respiratorios (focos hemorrágicos renales e infiltración vascular pulmonaria), encontrado en un estudio de 3 meses de duración con ratas expuestas al vanadio mediante agua potable (Domingo 1985, según se cita en ATSDR 1992). ATSDR (1992) no desarrolló un NMR oral crónico, sin embargo se puede aplicar un factor de 10 al NMR de duración intermedia con el fin de representar una duración crónica y arrojando como resultado un NMR de  $3E-4$  mg/kg/día.

La DR de la tabla MPR de USEPA Región 9 (basada en el USEPA IRIS) se utilizará en esta evaluación de riesgos ya que las otras derivaciones corresponden al vanadio (IV).

### Concentración Referencial para Exposición por Inhalación Crónica (CR)

*Health Canada* no ha desarrollado una concentración tolerable para el vanadio (*Health Canada* 1996).

Actualmente no se dispone de una CR referente al vanadio o el pentóxido de vanadio (USEPA 2004). ATSDR desarrolló un NMR para inhalación de duración aguda de  $2E-4$  mg/m<sup>3</sup> basado en un LOAEL de 0.06 mg/m<sup>3</sup>, el cual ocasionó tos e irritación respiratoria en voluntarios humanos expuestos a polvo de pentóxido de vanadio durante 8 horas (Zenz and Berg 1967, según se cita en ATDR 1992). El NMR correspondiente a inhalación de duración aguda se dedujo corrigiendo el NOAEL para exposición continua y posteriormente dividiéndolo por un factor de incertidumbre de 100 (dando cuenta de

la variabilidad de los seres humanos y el uso de un LOAEL en lugar de un NOAEL). No se identifican datos cuantitativos adecuados sobre la exposición con el fin de calcular un NMR correspondiente a inhalación intermedia o crónica.

### Efectos Cancerígenos

*Health Canada* no ha clasificado la posible carcinogenicidad de vanadio (*Health Canada* 2004) y actualmente no se dispone de la clasificación de carcinogenicidad para el vanadio o pentóxido de vanadio por parte de USEPA (USEPA 1988, 1996). Tampoco se han encontrado estudios de carcinogenicidad mediante exposiciones orales o dérmicas para compuestos de vanadio pentavalente. Se reportó clara evidencia de carcinogenicidad en un estudio con ratones machos y hembras expuestos al pentóxido de vanadio mediante inhalación y cierta evidencia de carcinogenicidad en ratones machos, pero no en ratas hembras según la presencia de neoplasmas alveolares/bronquiales (Ress 2003). Los efectos se observaron para concentraciones inhaladas que exceden ligeramente los límites de exposición ocupacional humana permisible ( $0.5 \text{ mg/m}^3$ ; Ress 2003). Estudios crónicos realizados con ratas (Dai 1994, Dai y McNiel 1994, según se cita en OMS 2001) y en ratones (Kanisawa y Schroeder 1967, según se cita en UK EGVM) expuestos a sulfato de vanadio en agua potable, no aumentaron la incidencia de tumores espontáneos en ratones o ratas, aunque causaron una reducción en el aumento de peso corporal en ratas. La Agencia Internacional para la Investigación del Cáncer (IARC 2005) clasificó al pentóxido de vanadio en el grupo 2B, es decir posiblemente cancerígeno para seres humanos.

### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone de un factor de pendiente oral para el vanadio o pentóxido de vanadio (*Health Canada* 2004 y USEPA 1988, 1996).

### Riesgo de Desarrollar Cáncer Debido a una Exposición por Inhalación

No se dispone de un factor de pendiente de inhalación para el vanadio o pentóxido de vanadio (*Health Canada* 2004 y USEPA 1988, 1996).

### **Resumen**

|                                    |                   |                      |
|------------------------------------|-------------------|----------------------|
| DR oral crónica                    | 0.00504 mg/kg/día | USEPA Región 9, 2008 |
| CR por inhalación                  | no disponible     | USEPA 1988,1996      |
| factor de pendiente oral           | no disponible     | USEPA 1988,1996      |
| factor de pendiente por inhalación | no disponible     | USEPA 1988,1996      |

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## **Zinc**

### **Farmacocinética**

#### Exposición Oral

La farmacocinética del zinc posterior a una exposición oral se considera bien caracterizada en seres humanos, ya que es un nutriente esencial y uno de los metales traza más abundantes en el cuerpo humano (ATSDR 2003). La absorción a través del duodeno y los intestinos se regula en forma homeostática, y en condiciones fisiológicas normales 20 a 30% del zinc ingerido se absorbe a través de difusión pasiva y un proceso por mediación de un portador. El contenido de zinc más alto corresponde a los músculos, los huesos, el tracto gastrointestinal, los riñones, el cerebro, la piel, los pulmones, el corazón y el páncreas (ATSDR 2003).

La mayor parte del zinc se excreta mediante las heces y también mediante la orina, las rutas menores corresponden a la secreción salival, la pérdida de cabello y el sudor.

#### Exposición por Inhalación

La información disponible sobre la absorción, distribución y excreción del zinc después de la exposición por inhalación en seres humanos y animales, se considera limitada, aunque estudios reportan un aumento en los niveles del zinc en la sangre y en la orina después de la exposición por inhalación (ATSDR 2003). La absorción de zinc a través de los pulmones depende del tamaño de las partículas y de la solubilidad de su compuesto y en un estudio ocupacional se reportó elevados niveles de zinc en la orina posterior a la exposición al mismo, lo cual sugiere que la orina es una ruta de excreción principal.

#### Exposición Dérmica

La información disponible sobre la absorción, distribución y excreción del zinc después de la exposición dérmica en seres humanos y animales, se considera limitada, aunque estudios reportan un aumento en los niveles del zinc en la sangre y en la orina después de la exposición a la piel (ATSDR 2003). No se encontraron estudios sobre la excreción del zinc después de la exposición dérmica en seres humanos o animales (ATSDR 2003).

## **Toxicidad**

### Efectos no Cancerígenos

#### Exposición Oral

Los efectos de la exposición oral del zinc en seres humanos incluyen efectos gastronómicos, efectos hematológicos, daños inmunológicos y respuestas inflamatorias después de dosis altas, y efectos neurológicos después de la ingesta de zinc metálico (causando letargo, mareos, tambaleos y dificultad para escribir) (ATSDR 2003).

#### Exposición por Inhalación

Los efectos de la exposición por inhalación del zinc en seres humanos incluyen: fiebre por humo de metales (de óxidos de zinc), daños a las membranas mucosas y disnea, tos, dolor pleurítico del pecho, irritación del tracto respiratorio (cloruro de zinc), náuseas (óxido de zinc y vapores de cloruro) y varios efectos inmunológicos (óxido de zinc) (ATSDR 2003).

#### Exposición Dérmica

Los efectos de la exposición dérmica al zinc en seres humanos incluyen: anemia y disminución del número de plaquetas (después de la exposición a soluciones de cloruro de zinc), irritación cutánea general después de la exposición a cloruro de zinc y daño ocular después de la exposición ocular directa a una pasta que contiene 30% de cloruro de zinc (ATSDR 2003).

#### Dosis Referencial para la Exposición Oral Crónica (DR)

*Health Canada* publicó una ingesta diaria tolerable de 0.5 mg/kg/día para el zinc (*Health Canada* 2009).

USEPA desarrolló una DR para el zinc de  $3 \times 10^{-1}$  mg/kg/día tomando como base un estudio sobre suplementos alimenticios para seres humanos el cual encontró una reducción del 47% del superóxido dismutasa de los eritrocitos y enzimas de la sangre en mujeres adultas después de una exposición de 10 semanas (USEPA 2006). No se determinó un NOAEL aunque el LOAEL correspondió a 59.72 mg/día (convertidos en 1.0 mg/kg/día, sobre la base de un peso corporal de 60 kg para las mujeres). Se aplicó un factor de incertidumbre de 3 para un LOAEL derivado de un estudio sobre exposición de duración moderada (el cual utilizó una sub-población sensible) y el hecho de que el zinc es un nutriente esencial (USEPA 2006). Se reportó que la confianza en la DR es media debido al estudio, la base de datos y el valor de la DR.

### Concentración Referencial para Exposición por Inhalación Crónica (CR)

Actualmente no se dispone de una CR o concentración tolerable para el zinc (USEPA 2006 y *Health Canada* 2009).

### Efectos Cancerígenos

*Health Canada* no ha evaluado la carcinogenicidad del zinc (*Health Canada*, 1996). USEPA lo clasifica en el grupo D, es decir no clasificable como cancerígeno para los seres humanos, según la evidencia inadecuada con respecto a los seres humanos y los animales (USEPA 2006).

### Riesgo de Desarrollar Cáncer por Exposición Oral

No se dispone del factor de pendiente oral para el zinc y (*Health Canada* 2009 USEPA 2006).

### Riesgo de Desarrollar Cáncer Debido a la Exposición por Inhalación

No se dispone del factor de pendiente de inhalación para el zinc (*Health Canada* 2009 y USEPA 2006).

### **Resumen**

|                                    |                |                                  |            |
|------------------------------------|----------------|----------------------------------|------------|
| DR oral crónica                    | 3E-1 mg/kg/día | reducción de la enzima sanguínea | USEPA 2006 |
| CR por inhalación                  | no disponible  |                                  | USEPA 2006 |
| factor de pendiente oral           | no disponible  |                                  | USEPA 2006 |
| factor de pendiente por inhalación | no disponible  |                                  | USEPA 2006 |

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**ANEXO XIX**

**APÉNDICE G**

**Parámetros de Exposición para la Evaluación de  
Riesgos a la Vida Silvestre**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

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## **1 RESUMEN**

En este apéndice se resume los datos, métodos y fuentes de material bibliográfico utilizadas con el fin de obtener parámetros para el modelo de la cadena alimenticia de la vida silvestre. Los parámetros requeridos incluyen:

- concentraciones de CIP en elementos de la dieta; y
- parámetros de exposición específicos del receptor, incluyendo peso corporal, composición de la dieta, tasas de ingesta de alimentos, agua y suelos, y tamaño del ámbito de hogar.

Las hojas de cálculo del modelo de la cadena alimenticia en Excel<sup>TM</sup> se presentan en el Anexo XIX, Apéndice I. Los valores y fuentes de los parámetros se presentan en las hojas de cálculo.



## 2 ESTRUCTURA DEL MODELO DE LA CADENA ALIMENTICIA

Para cada combinación de CIP y receptor se calculó una dosis diaria total (mg/kg-día) según la siguiente ecuación:

$$Dosis = \frac{TIA \cdot C_{dieta} + TIA \cdot C_{agua} + TIS \cdot C_{suelo}}{PC}$$

donde TIA corresponde a la tasa de ingesta de alimentos (kg<sub>alimento-húmedo</sub>/día), WIR a la tasa de ingesta de agua (L<sub>agua</sub>/día), SIR a la tasa de ingesta de suelos (kg<sub>suelo-seco</sub>/día), Ci a la concentración de CIP en la dieta (mg<sub>CIP</sub>/kg<sub>alimentos-húmedo</sub>), agua (mg<sub>COPC</sub>/L) o suelo (mg<sub>CIP</sub>/kg<sub>suelo-seco</sub>), y PC al peso corporal (kg) del receptor. C<sub>dieta</sub>; se calculó a partir de las concentraciones de CIP medidas o estimadas para cada elemento de la dieta, ponderada por la fracción de cada elemento en la dieta del receptor. Se supuso que todos los receptores obtuvieron 100% de alimentos, agua y suelo consumidos dentro del área de estudio principal (es decir el tamaño del ámbito de hogar de todas las especies de receptores resultó menor que el área de estudio principal). Se asumió también que se dispuso del total de los CIP en todos los medios al 100% (es decir no se efectuó ningún ajuste para la posible biodisponibilidad limitada de los CIP en uno o más medios); correspondiendo a un supuesto conservador el cual se utiliza para la evaluación a nivel de análisis, debido a que muchos metales tienen una biodisponibilidad limitada en relación con las sales de metales solubles que normalmente se aplican en estudios toxicológicos como base para los valores de referencia de la toxicidad.

### 2.1 CONCENTRACIONES DE CIP EN LOS ELEMENTOS DE LA DIETA

A menos que se especifique lo contrario, todas las concentraciones de CIP en los tejidos (vegetación, cultivos, peces, invertebrados) se reportaron como concentraciones en peso húmedo, o convertidas a concentraciones en peso húmedo antes del modelado. Las concentraciones de CIP de suelo se expresaron como concentraciones de peso seco con el fin de evitar confundir la influencia de alta variabilidad en el contenido de humedad del suelo. Tal como se indicó anteriormente la tasa de ingesta de suelo por lo tanto se expresó en términos de peso seco. Las concentraciones de CIP de línea base y del caso de impacto en el suelo, agua, invertebrados terrestres, hojas, frutas y peces utilizadas en el modelo de la cadena alimenticia se incluyen en el Anexo XIX, Apéndice I y las concentraciones de CIP en insectívoros y mamíferos

herbívoros pequeños así como en mamíferos herbívoros grandes se indican a continuación.

### 2.1.1 Mamíferos Pequeños

Las concentraciones de CIP en mamíferos pequeños (como presas de jaguares y águilas crestadas) se estimaron a partir de las concentraciones de CIP en el suelo o en la dieta utilizando las ecuaciones que se describen más adelante (Tabla 1). El resumen de las estadísticas para las concentraciones de CIP en el suelo (estimados de exposición del límite superior y de tendencia central) se presenta en el Anexo XIX, Apéndice C y las concentraciones de CIP en los tejidos de la dieta de mamíferos pequeños (es decir, gusanos) se estimaron tal como se describe en el Anexo XIX, Apéndice C. Cuando se requirió la conversión de las concentraciones de tejido de peso seco a peso húmedo, se utilizó un contenido de humedad promedio específico para el área de 76%

**Tabla 1            Resumen de Modelos de Bioacumulación para Mamíferos Pequeños**

| CIP       | Modelo de Bioacumulación                                                                |            |
|-----------|-----------------------------------------------------------------------------------------|------------|
|           | Modelo                                                                                  | Fuente     |
| aluminio  | no disponible ningún modelo de bioacumulación para mamíferos pequeños                   | n/d        |
| antimonio | $[\text{mamífero pequeño}] = 0.001 \times 50 \times [\text{gusano}]$                    | USEPA 2007 |
| arsénico  | $\text{en } [\text{mamífero pequeño}] = 0.8188 \times \text{En}[\text{suelo}] - 4.8471$ | USEPA 2007 |
| bario     | $[\text{mamífero pequeño}] = 0.00015 \times 50 \times [\text{gusano}]$                  | USEPA 2007 |
| cadmio    | $\text{en } [\text{mamífero pequeño}] = 0.4723 \times \text{En}[\text{suelo}] - 1.2571$ | USEPA 2007 |
| cromo     | $\text{en } [\text{mamífero pequeño}] = 0.7338 \times \text{En}[\text{suelo}] - 1.4599$ | USEPA 2007 |
| cobalto   | $\text{en } [\text{mamífero pequeño}] = 1.307 \times \text{En}[\text{suelo}] - 4.4669$  | USEPA 2007 |
| cobre     | $\text{en } [\text{mamífero pequeño}] = 0.1444 \times \text{En}[\text{suelo}] + 2.042$  | USEPA 2007 |
| plomo     | $\text{en } [\text{mamífero pequeño}] = 0.4422 \times \text{En}[\text{suelo}] + 0.0761$ | USEPA 2007 |
| molibdeno | no disponible ningún modelo de bioacumulación para mamíferos pequeños                   | n/d        |
| selenio   | $\text{en } [\text{mamífero pequeño}] = 0.3764 \times \text{en}[\text{suelo}] - 0.4158$ | USEPA 2007 |
| estroncio | no disponible ningún modelo de bioacumulación para mamíferos pequeños                   | n/d        |
| vanadio   | $[\text{mamífero pequeño}] = 0.0123 \times [\text{suelo}]$                              | USEPA 2007 |

### 2.1.2 Mamíferos Herbívoros Pequeños

Las concentraciones de CIP en mamíferos pequeños herbívoros se estimaron a partir de la dosis diaria de CIP para el mono araña (estimada a través del modelo de la cadena alimenticia, Anexo XIX, Apéndice I) utilizando factores de transferencia de bioacumulación (Baes 1984). Los únicos factores de transferencia de bioacumulación disponibles en el material bibliográfico consultado con el fin de representar a las especies herbívoras se infirieron a partir de los datos del ganado, para los fines de la evaluación estos factores de transferencia se asumieron con el objeto de representar al mono araña y a otros herbívoros pequeños consumidos por el jaguar y el águila crestada. A continuación se presenta un resumen de las ecuaciones utilizadas para las estimaciones (Tabla 2). Cuando se requirió la conversión de las concentraciones tisulares de peso seco a peso húmedo se utilizó un contenido de humedad de 68% (USEPA 1993)

**Tabla 2                      Resumen de Modelos de Bioacumulación para Mamíferos Pequeños Herbívoros**

| COPC      | Modelo de Bioacumulación                              |           |
|-----------|-------------------------------------------------------|-----------|
|           | Modelo                                                | Fuente    |
| aluminio  | $0.0015 \times \text{dosis diaria en el mono araña}$  | Baes 1984 |
| antimonio | $0.001 \times \text{dosis diaria en el mono araña}$   | Baes 1984 |
| arsénico  | $0.002 \times \text{dosis diaria en el mono araña}$   | Baes 1984 |
| bario     | $0.00015 \times \text{dosis diaria en el mono araña}$ | Baes 1984 |
| cadmio    | $0.00055 \times \text{dosis diaria en el mono araña}$ | Baes 1984 |
| cromo     | $0.0055 \times \text{dosis diaria en el mono araña}$  | Baes 1984 |
| cobalto   | $0.02 \times \text{dosis diaria en el mono araña}$    | Baes 1984 |
| cobre     | $0.01 \times \text{dosis diaria en el mono araña}$    | Baes 1984 |
| plomo     | $0.0003 \times \text{dosis diaria en el mono araña}$  | Baes 1984 |
| molibdeno | $0.006 \times \text{dosis diaria en el mono araña}$   | Baes 1984 |
| selenio   | $0.015 \times \text{dosis diaria en el mono araña}$   | Baes 1984 |
| estroncio | $0.0003 \times \text{dosis diaria en el mono araña}$  | Baes 1984 |
| vanadio   | $0.0025 \times \text{dosis diaria en el mono araña}$  | Baes 1984 |

### 2.1.3 Mamíferos Herbívoros Grandes

Las concentraciones de CIP en mamíferos herbívoros grandes se estimaron a partir de la dosis diaria de CIP para el tapir de Baird (estimada a través del modelo de la cadena

alimenticia Anexo XIX, Apéndice I) utilizando para ello factores de transferencia de bioacumulación (Baes 1984). Los únicos factores de transferencia de bioacumulación disponibles en el material bibliográfico consultado con el fin de representar a las especies herbívoras se infirieron a partir de los datos del ganado; para los fines de esta evaluación los factores de transferencia se asumieron para representar al tapir de Baird y a otros herbívoros grandes consumidos por el jaguar y el águila crestada. A continuación se resumen las ecuaciones utilizadas para las estimaciones (Tabla 3). Cuando se requirió la conversión de las concentraciones tisulares de peso seco a peso húmedo se utilizó un contenido de humedad de 68% (USEPA 1993).

**Tabla 3                    Resumen de Modelos de Bioacumulación para Mamíferos Herbívoros Grandes**

| CIP       | Modelo de Bioacumulación                         |           |
|-----------|--------------------------------------------------|-----------|
|           | Modelo                                           | Fuente    |
| aluminio  | $0.0015 \times \text{dosis diaria en el tapir}$  | Baes 1984 |
| antimonio | $0.001 \times \text{dosis diaria en el tapir}$   | Baes 1984 |
| arsénico  | $0.002 \times \text{dosis diaria en el tapir}$   | Baes 1984 |
| bario     | $0.00015 \times \text{dosis diaria en el tapir}$ | Baes 1984 |
| cadmio    | $0.00055 \times \text{dosis diaria en el tapir}$ | Baes 1984 |
| cromo     | $0.0055 \times \text{dosis diaria en el tapir}$  | Baes 1984 |
| cobalto   | $0.02 \times \text{dosis diaria en el tapir}$    | Baes 1984 |
| cobre     | $0.01 \times \text{dosis diaria en el tapir}$    | Baes 1984 |
| plomo     | $0.0003 \times \text{dosis diaria en el tapir}$  | Baes 1984 |
| molibdeno | $0.006 \times \text{dosis diaria en el tapir}$   | Baes 1984 |
| selenio   | $0.015 \times \text{dosis diaria en el tapir}$   | Baes 1984 |
| estroncio | $0.0003 \times \text{dosis diaria en el tapir}$  | Baes 1984 |
| vanadio   | $0.0025 \times \text{dosis diaria en el tapir}$  | Baes 1984 |

## 2.2                    PARAMETRIZACIÓN DE RECEPTORES

Los valores de cada parámetro se resumen en las hojas de cálculo del modelo de la cadena alimenticia específico para cada receptor (Anexo XIX, Apéndice I). A continuación se incluye los detalles con respecto a la fuente y la derivación de cada valor de parámetro de cada receptor.

## 2.2.1 Peso Corporal

Los valores de peso corporal (PC, kg) se obtuvieron de las fuentes a las que se hace referencia en la Tabla 4.

**Tabla 4 Pesos Corporales Utilizados para los Receptores**

| Receptor de Vida Silvestre | Peso Corporal [kg] | Referencia                                                      |
|----------------------------|--------------------|-----------------------------------------------------------------|
| <b>Mamíferos</b>           |                    |                                                                 |
| jaguar                     | 80.6               | Cascelli de Azevedo y Murray (2007) (media de machos y hembras) |
| tapir de Baird             | 250                | Foerster (2000) (estimado medio utilizado)                      |
| mono araña                 | 5.48               | Clark (1944) (media de 19 monos araña adultos)                  |
| armadillo                  | 6.0                | Frappell (1998)                                                 |
| <b>Aves</b>                |                    |                                                                 |
| águila crestada            | 2.9                | (hembra en cautiverio) Kiff et Al., 1989                        |
| martín pescador grande     | 0.32               | Wildbirds Unlimited (2009)                                      |
| Loro cabeza azul           | 0.29               | Gilardi y Munn (1988)                                           |
| zorzalito de Swainson      | 0.03               | Dunning (1984)                                                  |

Nota: kg = kilogramo.

## 2.2.2 Tasa de Ingesta de Alimentos

Las tasas de ingesta de alimentos (TIA) se expresan en kg alimentos/día peso húmedo (ph) y se obtuvieron de las fuentes a las que se hace referencia en la Tabla 5.

**Tabla 5 Tasas de Ingesta de Alimentos Utilizadas para los Receptores**

| Receptor de Vida Silvestre | FIR<br>[kg <sup>dieta-húmedo</sup> /día] | Referencia                                                                              |
|----------------------------|------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Mamíferos</b>           |                                          |                                                                                         |
| jaguar                     | 1.4                                      | Emmons (1987) (basado en un jaguar en cautiverio)                                       |
| tapir de Baird             | 20.7                                     | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.0687 \times PC^{0.822}$ |
| mono araña                 | 1.11                                     | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.0687 \times PC^{0.822}$ |
| armadillo                  | 1.25                                     | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.0687 \times PC^{0.822}$ |
| <b>Aves</b>                |                                          |                                                                                         |
| águila crestada            | 0.195                                    | USEPA (1993) (TIA calculada para todas las aves)<br>$TIA = 0.0582 \times PC^{0.651}$    |
| martín pescador grande     | 0.16                                     | Sample y Suter 1994 (martín pescador norteno, ajustado para PC)                         |
| loro cabeza azul           | 0.109                                    | USEPA (1993) (TIA calculada para todas las aves)<br>$TIA = 0.0582 \times PC^{0.651}$    |
| zorzalito de Swainson      | 0.025                                    | USEPA (1993) (TIA calculada para todas las aves)<br>$TIA = 0.0582 \times PC^{0.651}$    |

Notas: Las TIA calculadas se convirtieron a una concentración ph dividiendo la tasa de ingesta de alimentos por 1-MC, PC = peso corporal, TIA = tasa de ingesta de alimentos, CH = contenido de humedad, ph = peso húmedo.

### 2.2.3 Tasa de Ingesta de Agua

Las tasas de ingesta de agua (TIA) se expresan en L/día y se obtuvieron de las fuentes a las que se hace referencia en la Tabla 6.

**Tabla 6 Tasas de Ingesta de Agua Utilizadas para los Receptores**

| Receptor de Vida Silvestre | TIA [L/día] | Referencia                                                                           |
|----------------------------|-------------|--------------------------------------------------------------------------------------|
| <b>Mamíferos</b>           |             |                                                                                      |
| jaguar                     | 5.14        | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.099 \times PC^{0.9}$ |
| tapir de Baird             | 14.25       | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.099 \times PC^{0.9}$ |
| mono araña                 | 0.46        | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.099 \times PC^{0.9}$ |
| armadillo                  | 0.50        | USEPA 1993 (TIA calculada para todos los mamíferos)<br>$TIA = 0.099 \times PC^{0.9}$ |
| <b>Aves</b>                |             |                                                                                      |
| águila crestada            | 0.122       | USEPA 1993 (TIA calculada para todas las aves)<br>$TIA = 0.059 \times PC^{0.67}$     |
| martín pescador grande     | 0.034       | Sample y Suter (1994) (martín pescador norteno, ajustado para PC)                    |
| loro cabeza azul           | 0.026       | USEPA 1993 (TIA calculada para todas las aves)<br>$TIA = 0.059 \times PC^{0.67}$     |
| zorzalito de Swainson      | 0.006       | USEPA 1993 (TIA calculada para todas las aves)<br>$TIA = 0.059 \times PC^{0.67}$     |

Notas: PC - peso corporal, TIA - Tasa de ingesta de alimentos, CH - contenido de humedad, ph - peso húmedo

## 2.2.4 Tasa de Ingesta de Suelo

Las tasas de ingesta de suelo (TIS) se expresan en L/día y se obtuvieron de las fuentes a las que se hace referencia en la Tabla 7. Las TIS para el jaguar y el mono araña se asumieron como cero (es decir la ingesta incidental de suelo es insignificante) según los hábitos alimenticios de estas especies.

**Tabla 7 Tasas de Ingesta de Suelo Utilizadas para los Receptores**

| <b>Receptor de Vida Silvestre</b> | <b>TIS<br/>(kg<sub>suelo-seco</sub>/día)</b> | <b>Referencia</b>                                                                                                           |
|-----------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>Mamíferos</b>                  |                                              |                                                                                                                             |
| jaguar                            | 0                                            | Emmons (1987)                                                                                                               |
| tapir de Baird                    | 0.15                                         | Beyer (1994) (2.3 por ciento de la TIA de peso seco, extraída del jabalí)                                                   |
| mono araña                        | 0                                            | White (1986)                                                                                                                |
| armadillo                         | 0.05                                         | Beyer (1994) (17% de la TIA de peso seco)                                                                                   |
| <b>Aves</b>                       |                                              |                                                                                                                             |
| águila crestada                   | 0                                            | Sample y Suter (1994) (águila calva)                                                                                        |
| martín pescador grande            | 0                                            | Sample y Suter (1994) (martín pescador norteno)                                                                             |
| loro cabeza azul                  | 0.0026                                       | Se asume como el 10% de la TIA debido a las marcas dejadas por las aves en las paredes de arcilla (Burger y Gochfeld, 2003) |
| zorzalito de Swainson             | 0.0001                                       | Sample y Suter (1994) (petirrojo americano)                                                                                 |

Nota: TIS - tasa de ingesta de suelo

### 2.2.5 Preferencias Dietarias

Las preferencias dietarias para los receptores en este estudio tuvieron por finalidad representar a las comunidades de alimentación genéricas (por ejemplo insectívoros, herbívoros, carnívoros) en contraposición con una evaluación de la conducta de alimentación específica del área de cualquier especie individual. Las preferencias dietarias para los receptores seleccionados se muestran en la Tabla 8.



**Tabla 8 Preferencias Dietarias Utilizadas para los Receptores**

| <b>Receptor de Vida Silvestre</b> | <b>Dieta [porcentaje]</b>                                                                                          | <b>Referencia</b>                                                                                                                                                                       |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mamíferos</b>                  |                                                                                                                    |                                                                                                                                                                                         |
| jaguar                            | 30% de mamíferos herbívoros grandes, 30% de mamíferos herbívoros pequeños, 30% de mamíferos pequeños, 10% de peces | estimado según Emmons (1987)                                                                                                                                                            |
| tapir de Baird                    | 100% de hojas                                                                                                      | Tobler (2002)                                                                                                                                                                           |
| mono araña                        | 80% de fruta, 20% de hojas                                                                                         | White (1986)                                                                                                                                                                            |
| armadillo                         | 100% de invertebrados terrestres                                                                                   | da Silveira Anacleto (2007)                                                                                                                                                             |
| <b>Aves</b>                       |                                                                                                                    |                                                                                                                                                                                         |
| águila crestada                   | 50% de mamíferos herbívoros pequeños, 50% de mamíferos pequeños                                                    | Robinson (1994)<br>Las aves y peces también se consumen y se asumió que tienen concentraciones de CIP en el tejido similares a las de los mamíferos pequeños                            |
| martín pescador grande            | 100% de peces                                                                                                      | Wildbirds Unlimited (2009)                                                                                                                                                              |
| loro cabeciazul                   | 100% de fruta                                                                                                      | World Parrot Trust (2009). Las semillas y flores también se consumen y se asumió en forma conservadora, que tienen concentraciones de CIP en el tejido similares a la fruta             |
| zorzalito de Swainson             | 100% de invertebrados terrestres                                                                                   | Ehrlich (1988). Los zorzalitos de Swainson se alimentan también de algunas frutas en el invierno aunque se asumió en forma conservadora, que comían únicamente invertebrados terrestres |

### 2.2.6 Rango de Hábitat

Se utilizó datos de ámbito de hábitat con el fin de estimar el porcentaje global de tiempo que un receptor pasa dentro del área de estudio, el tamaño del área de estudio principal se estimó en 41,351 hectáreas (Figura 1-2), y todos los receptores tienen un rango de hábitat más pequeño que el área de estudio principal y en consecuencia se

## Parámetros de Exposición para la Evaluación de Riesgos a la Vida Silvestre

espera que obtengan 100% de su dieta dentro del área de estudio principal. El jaguar es la especie faunística con el rango de hogar más grande, el cual es aproximadamente 60 km<sup>2</sup> en el hábitat del bosque tropical para los machos y 40 km<sup>2</sup> para las hembras (Silver 2004, Cascelli de Azevedo y Murray 2007). De esta manera, el área de estudio principal se considera suficientemente grande como para contener varios rangos de hogar del jaguar). En la Tabla 9 se presenta los rangos de hábitat para los receptores de vida silvestre.

**Tabla 9 Rangos de Hábitat Utilizados para los Receptores**

| Receptor de Vida Silvestre | Rango de Hábitat [ha] | Referencia                                                                                                 |
|----------------------------|-----------------------|------------------------------------------------------------------------------------------------------------|
| <b>Mamíferos</b>           |                       |                                                                                                            |
| jaguar                     | 3,820                 | Cascelli de Azevedo y Murray (2007) (en forma conservadora se utilizó el rango más pequeño de las hembras) |
| tapir de Baird             | 125                   | Foerster y Vaughan (2002)                                                                                  |
| mono araña                 | 276                   | Wallace (2008) (promedio de rangos presentado en la Tabla 1)                                               |
| armadillo                  | 10                    | Loughry (1998) (valor medio utilizado)                                                                     |
| <b>Aves</b>                |                       |                                                                                                            |
| águila crestada            | 800                   | Robinson (1994)                                                                                            |
| martín pescador grande     | 0.39                  | Sample y Suter (1994) (martín pescador norteño)                                                            |
| loro cabeza azul           | 16.67                 | Robinson (2000)                                                                                            |
| zorzalito de Swainson      | 0.42                  | Sample y Suter (1994) (petirrojo americano)                                                                |

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**ANEXO XIX**

**APÉNDICE H**

**Valores de Referencia de Toxicidad de la Vida  
Silvestre**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

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## **1 GENERALIDADES**

Este apéndice presenta un resumen de los métodos y fuentes de datos utilizados para obtener los valores de referencia de toxicidad (VRT) aplicables a la evaluación del riesgo para la fauna silvestre. Los VRT se utilizan como umbrales de efectos para la evaluación de las tasas estimadas de consumo de contaminantes de interés potencial (CIP) por parte de los receptores. Las Tablas 1 y 2 presentan un resumen de los VRT obtenidos.

Tabla 1 Datos de Toxicidad Utilizados para Calcular los Valores de Referencia de Toxicidad en Mamíferos

| Parámetro      | VRT Inferiores | VRT Superiores | Detalles del Estudio de Toxicidad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------|----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Metales</b> |                |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Aluminio (Al)  | 1.93           | 19.3           | No existían niveles de ecológicos de evaluación del suelo (Eco-SSL) para los efectos del aluminio en las especies de mamíferos de la fauna silvestre. La Agencia de Protección Ambiental de los Estados Unidos (USEPA 2003) reconoce que los parámetros de evaluación del suelo que se utilizan comúnmente se basan en pruebas de toxicidad de laboratorio en las que se añade una solución de aluminio a los suelos de prueba, los cuales no son relevantes para las muestras de suelo de campo. Por tal motivo, los valores de referencia de toxicidad (VRT) utilizados en la Evaluación del Riesgo para la Ecología (ERE) son sumamente conservadores, y se debe tener cuidado al interpretar los casos en los que se exceden los VRT. Sample et al. (1996) obtuvieron una serie de VRT a partir de un estudio de exposición al aluminio a través del agua para beber en tres generaciones de ratones (Ondreicka et al. 1966). Se registró una concentración de efecto negativo mínimo observado (LOAEC) de 19.3 mg/kg-día para los efectos en la reproducción (es decir, número de camadas, número de crías y crecimiento) en ratones de laboratorio expuestos a 19.3 mg/kg-día de aluminio (cloruro de aluminio). Se aplicó un factor de extrapolación de 10 a la LOAEC a fin de obtener una concentración de efecto negativo no observado (NOAEC) de 1.93 mg/kg-día. Se consideró que la exposición era crónica porque se extendió más de un año y durante una etapa crítica completa (es decir, durante la reproducción). |
| Antimonio (Sb) | 0.059          | 0.59           | Había un Eco-SSL de la USEPA disponible (2005a). Se calculó una media geométrica de 13.3 mg/kg bw/día Sb con respecto a los valores de la NOAEC para el crecimiento y la reproducción. Sin embargo, debido a que este valor era superior a la LOAEC determinada más baja para los efectos en la reproducción, crecimiento o supervivencia, el VRT inferior fue fijado en 0.059 mg/kg-día Sb, lo cual corresponde a la NOAEC determinada más alta por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. El valor del NOAEC se derivó del estudio con ratas realizado por Rossi et al. (1987) en el que se administró antimonio a las ratas hembras en el agua durante 31 días y se observó un efecto en el peso de las crías. El LOAEC obtenido en este estudio fue utilizado como el VRT (0.59 mg/kg-día Sb).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Arsénico (As)  | 1.04           | 1.66           | La media geométrica de los valores del NOAEL para el crecimiento y la reproducción basada en diversos estudios con mamíferos de laboratorio estándar fue calculada en 2.47 mg/kg-día (U.S. EPA 2005b). Sin embargo, debido a que este valor fue superior al LOAEL determinado más bajo para los resultados de reproducción, crecimiento o supervivencia, se estableció un VRT de 1.04 mg/kg-día, el cual corresponde al NOAEL determinado más alto por debajo del LOAEL determinado más bajo para la reproducción, crecimiento o supervivencia (Neiger y Osweiler 1989; citado en US EPA 2005b). Los VRT se derivaron de un estudio de alimentación de 8 meses en perros jóvenes (Canis familiares) y el LOAEL se basó en los efectos sobre el crecimiento.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Bario (Ba)     | 51.8           | 121            | Había un Eco-SSL de la USEPA disponible (2005b). Se revisó diez estudios con especies de mamíferos (y 27 puntos finales de efectos). Se calculó una media geométrica de 51.8 mg/kg-día Ba con respecto a los valores de la NOAEC para los efectos en el crecimiento y la reproducción. Este valor fue inferior a la LOAEC determinada más baja para reproducción, crecimiento o supervivencia; por consiguiente, el VRT inferior fue fijado en 51.8 mg/kg-día Ba. El valor de la LOAEC determinada más baja fue 121 mg/kg-día Ba (Dietz et al. 1992, citado en USEPA 2005b).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Cadmio (Cd)    | 0.77           | 7.7            | Había un Eco-SSL de la USEPA disponible (2005c). Se calculó una media geométrica de de 1.86 mg/kg-día Cd con respecto a los valores de la NOAEC para la reproducción y el crecimiento. Sin embargo, este valor era superior a la LOAC determinada más baja para la reproducción, el crecimiento o la mortalidad; por lo tanto, el VRT inferior tuvo un valor similar al de la NOAEC determinada más alta por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia (0.77 mg/kg-día Cd; USEPA 2005c). La LOAEC correspondiente fue 7.7 mg/kg-día Cd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Cromo (Cr)     | 2.4            | 2.82           | En el caso del cromo trivalente, la media geométrica de los valores del NOAEL para el crecimiento y la reproducción basada en múltiples estudios con mamíferos de laboratorio fue calculada en 2.40 mg/kg-día (U.S. EPA 2008a). Dicho valor fue utilizado como el VRT inferior. No existía un LOAEL determinado para el cromo trivalente; por lo tanto, el valor del LOAEL más bajo para el crecimiento, la reproducción y la supervivencia por encima del NOAEL establecido por la US EPA (US EPA 2008a) fue utilizado como VRT (2.82 mg/kg-día). Este LOAEL se basa en un estudio realizado por Mercado y Bibby (1973) en el que se expuso a ratas jóvenes a cromo III a través del agua para beber durante un periodo de 50 días. El LOAEL se basa en una reducción de la supervivencia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Cobalto (Co)   | 7.33           | 10.9           | Había un Eco-SSL de la USEPA disponible (2005d). Se calculó una media geométrica de 7.33 mg/kg-día Co con respecto a los valores del NOAEL para el crecimiento y la reproducción. Este valor es inferior a la LOAEC determinada más baja para los puntos finales de reproducción, crecimiento o supervivencia. Por lo tanto, el VRT inferior tuvo el mismo valor que la media geométrica de los valores de NOAEL para la reproducción y el crecimiento (7.33 mg/kg-día Co). La LOAEC determinada más baja para los puntos finales de supervivencia, reproducción y crecimiento fue 10.9 mg/kg-día Co (Domingo et al. 1985, citado en USEPA 2005d).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Tabla 1 Datos de Toxicidad Utilizados para Calcular los Valores de Referencia de Toxicidad en Mamíferos (continuación)

| Parámetro      | VRT Inferiores | VRT Superiores | Detalles del Estudio de Toxicidad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------|----------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cobre (Cu)     | 5.6            | 9.34           | Había un Eco-SSL de la USEPA disponible (2007a). Se calculó una media geométrica de 25 mg/kg-día Cu con respecto a los valores de la NOAEC para la reproducción y el crecimiento. Sin embargo, debido a que este valor fue superior a la LOAEC determinada más baja para los resultados de reproducción, crecimiento o mortalidad, el VRT fue igual a la NOAEC determinada más alta por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. El último valor fue 5.6 mg/kg-día Cu, y fue obtenido a partir de un estudio de exposición de cerdos jóvenes al cobre ( <i>Sus scrofa</i> ) durante 4 semanas; los puntos finales sensitivos incluyeron el crecimiento y la supervivencia (Allcroft et al. 1961). La LOAEC correspondiente fue 9.34 mg/kg-día Cu.                                                                                                |
| Plomo (Pb)     | 4.7            | 8.9            | Había un Eco-SSL de la USEPA disponible (2005e). Se calculó una media geométrica de 40.7 mg/kg-día Pb con respecto a los valores del NOAEL para la reproducción y el crecimiento. Sin embargo, debido a que este valor es superior a la LOAEC determinada más baja para los resultados de reproducción, crecimiento y mortalidad, el valor del VRT fue igual al del NOAEL determinado más alto por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento y la supervivencia. El valor de este último fue 4.70 mg/kg-día Pb, y se derivó de un estudio de toxicidad del plomo en ratas ( <i>Rattus norvegicus</i> ) realizado por Kimmel et al. (1980, citado en USEPA 2005e) en el que se administró plomo durante 7 semanas a través del agua para beber. Los valores de la NOAEC y la LOAEC para el crecimiento en el estudio fueron 4.70 y 8.90 mg/kg-día Pb, respectivamente. |
| Molibdeno (Mo) | 0.26           | 2.6            | No existían Eco-SSLs para los efectos del molibdeno en las especies de mamíferos de la fauna silvestre. Se registró una LOAEC (2.6 mg/kg-día) y una NOAEC (0.26 mg/kg-día) para la reproducción (incidencia de enanismo) en los ratones expuestos a molibdato a través del agua por tres generaciones (Schroeder y Mitchner 1971, citado en Sample et al. 1996). Se consideró que el grado de exposición era crónico pues se produjo durante un periodo superior a un año y en una etapa crítica (reproducción).                                                                                                                                                                                                                                                                                                                                                                                         |
| Selenio (Se)   | 0.143          | 0.215          | Se utilizó un Eco-SSL de la USEPA (2007d) para identificar el VRT. Se calculó una media geométrica de 0.437 mg/kg-día con respecto a los valores de la NOAEC para la reproducción y el crecimiento. Sin embargo, este valor era superior a la LOAEC determinada más baja para los resultados de reproducción, crecimiento o mortalidad; por lo tanto, el valor del VRT fue igual al de la NOAEC determinada más alta por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. LA NOAEC fue obtenida a partir de un estudio (Mahan y Moxon 1984, citado en USEPA 2007d) en el que se expuso a cerdos jóvenes al selenio a través de la dieta durante un periodo de 37 días, en el que se observó una reducción en el peso corporal. El valor de la LOAEC (0.215 mg/kg-día Se) derivado de este estudio fue utilizado como el VRT superior.                    |
| Estroncio (Sr) | 263            | No disponible  | No existían Eco-SSL para los efectos del estroncio en las especies de mamíferos de la fauna silvestre. Se obtuvo un NOAEL de 263 mg/kg-día Sr a partir de un estudio en el que las ratas fueron expuestas al cloruro de estroncio a través del agua (3 niveles de dosis) durante 3 años (Skoryna 1981, citado en Sample et al. 1996). No se observó efectos negativos en ninguno de los niveles de dosis. No se pudo obtener una LOAEC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Vanadio (V)    | 4.16           | 8.31           | Había un Eco-SSL de la USEPA disponible (2005f). Se calculó una media geométrica de 5.92 mg/kg-día V con respecto a los valores de la NOAEC para el crecimiento y la reproducción. Sin embargo, debido a que esta media geométrica de la NOAEC fue superior a la LOAEC determinada más baja para el crecimiento, la reproducción o la supervivencia, el valor del VRT inferior fue igual a la NOAEC determinada más alta por debajo de la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. El valor del VRT inferior fue 4.16 mg/kg-día V y se basó en el estudio realizado por Sanchez et al. (1991) sobre la exposición de ratones ( <i>Mus musculus</i> ) al vanadio. La LOAEC fue 8.31 mg/kg-día V.                                                                                                                                                               |

Notas: < = menor que; Eco-SSL = nivel ecológico de evaluación del suelo; ERE = Evaluación del riesgo para la ecología; LOAEC = concentración de efecto negativo mínimo observado; mg/kg-día = miligramos por kilogramo-día; mg/kg bw/d = miligramos por kilogramo de peso corporal por día; NOAEC = concentración de efecto negativo no observado; PCB = bifenilos policlorados; VRT = valores de referencia de toxicidad; USEPA = Agencia de Protección Ambiental de los Estados Unidos; ww = peso húmedo.

Tabla 2 Datos de la Prueba de Toxicidad Utilizados para Calcular los Valores de Referencia de Toxicidad en Aves

| Parámetros     | VRT Inferior | VRT Superior | Detalles del Estudio de Toxicidad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|--------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Metales</b> |              |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Aluminio (Al)  | 4.17         | 8.33         | No existía un valor de Eco-SSL disponible para el aluminio. Los valores de la NOAEC determinada más baja y la LOAEC fueron obtenidos a partir de una revisión de la bibliografía. Huff et al. (1996) administraron sulfato de aluminio a pollos pequeños a través de la dieta durante un periodo de tres semanas. La NOAEC subcrónica no determinada para el crecimiento fue 41.7 mg/kg-día Al. La LOAEC fue 83.3 mg/kg-día Al. Se aplicó un factor de incertidumbre subcrónica a crónica de 10 al NOAEL y LOAEL.                                                                                                                                                                                                                                                                                                                                                                     |
| Antimonio (Sb) | n/a          | n/a          | No se identificó VRT de antimonio para las aves en la bibliografía revisada.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Arsénico (As)  | 2.24         | 7.38         | El VRT se basó en el NOAEL más bajo de 2.24 mg/kg-día, el cual fue establecido a partir de un estudio en el que se expuso a pollos pequeños a determinados niveles de arsénico a través de los alimentos y los puntos finales de prueba fueron el crecimiento y la reproducción (Holcman y Stibilj, 1997; citado en U.S. EPA 2005b). Se informó que el LOAEL de 7.38 mg/kg/día tuvo efectos en la supervivencia de los tordos de cabeza café expuestos a acetoarseniato de cobre durante 7 meses (Sample et al., 1996).                                                                                                                                                                                                                                                                                                                                                               |
| Bario (Ba)     | 20.8         | 41.7         | No existían Eco-SSL disponibles para los efectos del bario en las especies de aves de la fauna silvestre. La USEPA (2005b) sólo logró encontrar un estudio (Johnson et al. 1960) sobre la toxicidad del bario en las aves. No fue posible calcular un Eco-SSL para las especies de aves de la fauna silvestre ya que este cálculo requiere por lo menos tres resultados para dos especies de prueba. Se registró una LOAEC de 416.5 mg/kg-día Ba y una NOAEC de 208.3 mg/kg-día Ba con respecto a la mortalidad de los pollos pequeños con días de nacidos expuestos al hidróxido de bario a través de la dieta durante 4 semanas (Johnson et al. 1960, citado en Sample et al. 1996). Se aplicó un factor de extrapolación de 10 a la LOAEC y NOAEC para obtener una exposición de subcrónica a crónica.                                                                             |
| Cadmio (Cd)    | 1.47         | 2.37         | Se utilizó un Eco-SSL de la USEPA (2005c) para el cadmio con la finalidad de identificar el VRT inferior. El VRT se derivó de la relación entre la media geométrica de la NOAEC para el crecimiento y la reproducción y la LOAEC determinada más baja para la reproducción, el crecimiento y la supervivencia. El VRT del cadmio fue calculado en 1.47 mg/kg-día Cd tomando como base la media geométrica de los valores de la NOAEC, la cual fue inferior a la LOAEC determinada más baja (USEPA 2005c). La LOAEC determinada más baja para la supervivencia, el crecimiento o la reproducción fue identificada en USEPA 2005c. Leach et al. (1979) administraron cadmio a pollos ( <i>Gallus domesticus</i> ) a través de la dieta durante 12 semanas. Se observó efectos reproductivos (producción de huevos y crías) con la dosis de 2.37 mg/kg-día Cd pero no con dosis menores. |
| Cromo (Cr)     | 2.66         | 2.78         | Se utilizó un Eco-SSL establecido por la USEPA (2008a) para el cromo trivalente a fin de identificar el VRT inferior. El VRT se derivó de la media geométrica de los valores del NOAEL para la reproducción y el crecimiento. El VRT superior se derivó de un estudio realizado por Haseltine et al. (no publicado; citado en USEPA 2008a), en el que se expuso a patos negros a determinados niveles de cromo durante un periodo de 180-190 días a través de los alimentos. El VRT superior (2.78 mg/kg-día) se basa en los efectos reproductivos.                                                                                                                                                                                                                                                                                                                                   |
| Cobalto (Co)   | 7.61         | 7.8          | Se utilizó un Eco-SSL establecido por la USEPA (2005d) para el cobalto con la finalidad de identificar el VRT inferior. Se calculó una media geométrica de 7.61 mg/kg-día Co con respecto a los valores del NOAEL para el crecimiento y la reproducción de las aves (USEPA 2005d). Este valor fue inferior a la LOAEC determinada más baja para los puntos finales de reproducción, crecimiento o supervivencia. Por lo tanto, el valor del VRT fue igual a la media geométrica de los valores del NOAEL para la reproducción y el crecimiento (7.61 mg/kg-día Co). La NOAEC determinada más baja fue 3.89 mg/kg-día Co y la respectiva LOAEC fue 7.8 mg/kg-día Co; por lo tanto, la dosis de esta última fue asignada como el VRT superior.                                                                                                                                          |
| Cobre (Cu)     | 4.05         | 12.1         | Se utilizó un Eco-SSL establecido por la USEPA (2007a) para el cobre con la finalidad de identificar el VRT inferior. Se calculó una media geométrica de 18.5 mg/kg-día Cu con respecto a los valores de la NOAEC para la reproducción y el crecimiento. La media geométrica fue superior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. El valor del VRT fue igual al de la NOAEC determinada más alta inferior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia (4.05 mg/kg-día Cu). Dicho umbral se derivó de un estudio realizado por Al-Ankari et al. (1998) sobre la toxicidad reproductiva de los pollos ( <i>Gallus domesticus</i> ) que recibieron dosis de cobre a través de la dieta durante 84 días. La LOAEC para la producción de huevos fue 12.1 mg/kg-día Cu.                        |

Tabla 1-2 Datos de la Prueba de Toxicidad Utilizados para Calcular los Valores de Referencia de Toxicidad en Aves (continuación))

| Parámetros     | VRT Inferior | VRT Superior | Detalles del Estudio de Toxicidad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------|--------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Plomo (Pb)     | 1.63         | 3.26         | Se utilizó un Eco-SSL establecido por la USEPA (2005e) para el plomo con la finalidad de identificar el VRT inferior. Se calculó una media geométrica de 10.9 mg/kg-día Pb con respecto a los valores de la NOAEC para la reproducción y el crecimiento; sin embargo, este valor era más alto que la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. Por consiguiente, se asignó un valor de VRT igual a la NOAEC determinada más alta inferior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia (1.63 mg/kg-día Pb). Esta NOAEC se derivó de un estudio realizado por Edens y Garlich (1983) sobre la toxicidad del plomo en pollos ( <i>Gallus domesticus</i> ) que recibieron dosis de plomo por 4 semanas durante una etapa sensitiva; la LOAEC correspondiente para el éxito reproductivo fue 3.26 mg/kg-día Pb.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Molibdeno (Mo) | 3.5          | 35.3         | No existían Eco-SSL disponibles para los efectos del molibdeno en las especies de aves de la fauna silvestre. Se registró una LOAEC de 35.3 mg/kg-día Mo y una NOAEC de 3.5 mg/kg-día Mo para los efectos en la reproducción de los pollos expuestos a dosis de molibdeno de sodio a través de la dieta durante 21 días de la etapa reproductiva (Lepore y Miller 1965, citados por Sample et al. 1996). Se consideró que la exposición era crónica porque se produjo durante una etapa crítica (es decir, durante la reproducción).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Selenio (Se)   | 0.29         | 0.579        | Había un Eco-SSL establecido por la USEPA (2007d) para el selenio. Se calculó una media geométrica de 0.606 mg/kg-día con respecto a los valores del NOAEL para la reproducción y el crecimiento; sin embargo, este valor era superior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. Por lo tanto, el VRT fue igual al NOAEL determinado más alto inferior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia (0.29 mg/kg-día Se). La LOAEC correspondiente fue 0.579 mg/kg-día Se para la supervivencia (El-Begearmi y Combs 1982; citados en USEPA 2007d). Este estudio investigó la supervivencia de pollos jóvenes expuestos al selenio.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Estroncio (Sr) | 267          | 2,667        | No se identificó VRT para el estroncio en los documentos de referencia disponibles. Sin embargo, Mora et al. (2007) evaluaron la contaminación por estroncio en los cascarones de los huevos de nueve especies de paserinas (aves de percha) en regiones con altos niveles de estroncio en Arizona, y sostuvieron que las concentraciones elevadas de estroncio en los cascarones podrían afectar a los embriones en etapa avanzada debido a la posible interferencia en el metabolismo del calcio y el crecimiento de los huesos, provocando una reducción en el éxito de las eclosiones así como posibles deformaciones menores en el pico. Se identificó un estudio de toxicidad que podía ser sometido a una derivación de dosis límite; de manera específica, las gallinas White Leghorn que recibieron Sr como parte de su dieta experimentaron una reducción en la producción de huevos, mientras que aquéllas que recibieron 4 por ciento de Sr pusieron un número mayor de huevos agrietados (Mraz et al.1967). Esta exposición se convierte en 2,667 mg/kg-día Sr si se asume un peso corporal de 1.8 kg y un consumo de 120 g/día, y se asume que se trata de una LOAEC crónica (etapa sensitiva durante la reproducción). Se calculó una NOAEC crónica multiplicando la LOAEC crónica por un factor de extrapolación de 0.1. La evaluación del estroncio es mucho más incierta que la de otras sustancias debido a la escasez de datos sobre toxicidad, aunque el punto final de cascarones agrietados observado en el estudio de Mraz et al. (1967) es consistente con el mecanismo de interferencia con los procesos del calcio. |
| Vanadio (V)    | 0.344        | 0.688        | Había un Eco-SSL establecido por la USEPA (2005f) para el vanadio. Se calculó una media geométrica de 1.19 mg/kg-día V con respecto a los valores de la NOAEC para el crecimiento y la reproducción. La media geométrica fue superior a la LOAEC determinada más baja para el crecimiento, la reproducción o la supervivencia. La NOAEC determinada más alta inferior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia fue 0.344 mg/kg-día V. Dicho umbral fue obtenido a partir de un estudio realizado por Hill (1979), en el cual se administró dosis de vanadio a pollos ( <i>Gallus domesticus</i> ) a través de la dieta por 5 semanas y se midió los niveles de crecimiento (como peso corporal). La LOAEC correspondiente fue 0.688 mg/kg-día V.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Notas: < = menor que; Eco-SSL = nivel ecológico de evaluación del suelo; ERE = Evaluación del riesgo para la ecología; LOAEC = concentración de efecto negativo mínimo observado; mg/kg-día = miligramos por kilogramo-día; mg/kg bw/d = miligramos por kilogramo de peso corporal por día; n/a = no disponible; NOAEC = concentración de efecto negativo no observado; PCB = bifenilos policlorados; TRV = valores de referencia de toxicidad; USEPA = Agencia de Protección Ambiental de los Estados Unidos; ww = peso húmedo.

## 2 ENFOQUE GENERAL

Para identificar los VRT de la fauna silvestre, se utilizó un procedimiento por pasos. En los casos pertinentes, se seleccionó los Niveles Ecológicos de Evaluación del Suelo (Eco-SSLs) establecidos por la USEP para cada CIP (USEPA 2008b), los cuales constituyen una evaluación conservadora, sistemática y rigurosa de la información sobre la toxicidad de la fauna silvestre. En aquellos casos en los que no había Eco-SSLs disponibles, se procedió a revisar la bibliografía disponible para identificar a los VRT candidatos, comenzando por los Parámetros Toxicológicos para la Fauna Silvestre del Laboratorio Nacional de Oak Ridge (Sample et al. 1996) y, de ser necesario, revisando bibliografía detallada adicional de manera complementaria.

Los VRT utilizados en la evaluación del riesgo para los receptores de la fauna silvestre inicialmente se basaron en las concentraciones alimenticias o en las tasas de consumo asociadas a las concentraciones de efectos negativos no observados (NOAEC) para las pruebas con organismos (en adelante denominados VRT inferiores). Los Eco-SSLs “se establecieron con el propósito de preservar la distribución de la exposición y los efectos en las especies y deben utilizarse en la etapa de selección de la evaluación de riesgos ecológicos” (USEPA 2007a). Otros VRT inferiores son igualmente conservadores. Todos estos valores de evaluación de ecotoxicidad tienen como propósito evitar la subestimación de los riesgos, y no buscan identificar niveles de riesgo que justifiquen la adopción de acciones de control. Con la finalidad de proporcionar un contexto adecuado para cualquier exceso identificado de los VRT inferiores, se establecieron VRT adicionales con base en las concentraciones de efecto negativo mínimo observado (LOAEC) (en adelante denominados VRT superiores).

En la revisión de la bibliografía, la identificación de las NOAEC y LOAEC se basó en los efectos biológicamente importantes para los puntos finales de toxicidad relevantes, y no en simples pruebas de importancia estadística. Los umbrales se interpretaron de la siguiente manera:

- Los VRT inferiores brindan una evaluación conservadora de los posibles efectos negativos en los receptores de la fauna silvestre. El exceso de estos VRT podría, o no, provocar efectos negativos, aunque las exposiciones a CIP por debajo de los VRT inferiores podrían derivarse de la ERE con un nivel de confianza adecuado.
- Los VRT superiores brindan una evaluación más realista de los posibles efectos negativos en los receptores de la fauna silvestre pues se relacionan con aquellos consumos alimenticios que, según lo observado, generan efectos negativos en los organismos de prueba sensitivos. Sin embargo, dado que los VRT superiores representan los puntos finales relevantes documentados más sensitivos, éstos no deberán interpretarse como umbrales para las poblaciones o receptores de estudio reales, especialmente en aquellos casos en los que las especies sustitutas no correspondan a los receptores de interés específicos del área.



## **2.1 RESUMEN DE LA DERIVACIÓN DE NIVELES ECOLÓGICOS DE EVALUACIÓN DEL SUELO (ECO-SSL)**

El proceso de derivación de Eco-SSLs de aves y mamíferos se lleva a cabo de forma separada y se presume que proporcionará una protección adecuada para la fauna silvestre terrestre. El proceso de derivación de Eco-SSL constituye un esfuerzo compartido de un grupo de trabajo conformado por distintos grupos de interés, e identifica niveles de evaluación conservadores (incluyendo los VRT para especies de aves y mamíferos de la fauna silvestre). El VRT de los Eco-SSL fue utilizado como el VRT inferior en la evaluación del riesgo para la fauna silvestre. El VRT predeterminado de los Eco-SSL corresponde a la media geométrica de los valores de la concentración de efecto negativo no observado (NOAEC) para la reproducción y el crecimiento. Sin embargo, de conformidad con las reglas de derivación de Eco-SSL, en aquellos casos en los que dicha media geométrica sea superior a las concentraciones de efecto negativo mínimo observado (LOAEC) determinadas más bajas con respecto a la reproducción, el crecimiento o la supervivencia, el VRT de los Eco-SSL deberá ser igual a la NOAEC determinada más alta inferior a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia. En aquellos casos en los que hubiera VRT de Eco-SSL disponibles, el VRT superior deberá ser equivalente a la LOAEC determinada más baja para la reproducción, el crecimiento o la supervivencia.

## **2.2 OTROS VALORES DE REFERENCIA DE TOXICIDAD (VRT) BASADOS EN LA BIBLIOGRAFÍA**

Se llevó a cabo una revisión de la bibliografía sobre estudios de toxicidad en la fauna silvestre realizados para CPI que carecieran de información adecuada de Eco-SSL. El estudio secundario predeterminado para el proceso de derivación de VRT fue definido por Sample et al. (1996), y recomienda un solo estudio para cada CPI (estudios individuales para los receptores de mamíferos y aves). Sample et al. (1996) proporciona un recurso de gran utilidad para la derivación de VRT, así como un análisis transparente del procedimiento de derivación de VRT. Sin embargo, existen algunas discrepancias y/o selecciones cuestionables con respecto a determinados CPI; por consiguiente, se llevó a cabo una prueba de relevancia a través de una revisión de la bibliografía disponible para estos CPI.

A continuación se presenta una serie de consideraciones importantes para la selección de VRT con base en la bibliografía.

### **2.2.1 Efectos Biológicos Medidos en el Estudio**

Los puntos finales utilizados con mayor frecuencia en el estudio fueron la reproducción, el crecimiento y/o el desarrollo. La histopatología, la inducción enzimática, la

inmunosupresión y las respuestas de comportamiento no fueron consideradas puntos finales de medición adecuados debido a su cuestionable elación con los puntos finales de evaluación de riesgos. La no mortalidad no fue uno de los puntos finales de medición preferidos, a menos que se estuvieran evaluando otros efectos sub-letales (pero no observados) en el estudio. Los efectos medidos en el estudio fueron considerados “significativos” únicamente si presentaban una importancia biológica evidente (es decir, eran importantes para el mantenimiento general y la salud de la población). Los efectos estadísticamente importantes de poca o ninguna relevancia para la salud (debido al tamaño reducido de los efectos o los efectos compensatorios<sup>1</sup>) no fueron considerados como puntos finales relevantes. Se dio preferencia a aquellos estudios que proporcionaron una NOAEC y una LOAEC para el efecto de interés (es decir, los umbrales de efectos determinados).

### **2.2.2 Calidad Técnica del Estudio**

Los estudios deberán haber incluido un número suficiente de organismos de prueba así como un mecanismo de control adecuado. El contaminante sometido a investigación deberá haber sido aislado para evitar efectos interactivos. La prueba deberá haberse llevado a cabo con niveles normales de nutrición en la dieta, ya que muchos metales son más biodisponibles en dietas con deficiencia de nutrientes.

### **2.2.3 Método de Administración**

El método de administración utilizado con mayor frecuencia fue la exposición oral en la dieta, a través de los alimentos o el agua para beber, ya que se asume que los receptores recibirán la exposición por esta vía. La exposición oral mediante cápsulas o alimentación forzada (es decir, estudios con sondas) fueron los métodos de administración menos utilizados. Los estudios con inyecciones no fueron considerados como vías de exposición aceptables, ya que la ingesta gastrointestinal es un proceso que influye de manera significativa en la biodisponibilidad y toxicidad.

### **2.2.4 Duración del Estudio**

Los puntos finales de prueba crónicos y sub-crónicos se utilizaron con mayor frecuencia pues se asume, de manera conservadora, que los receptores de la fauna silvestre en los alrededores del Proyecto serán residentes de estas áreas por periodos lo suficientemente largos para experimentar una exposición crónica. Los estudios

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<sup>1</sup> Un ejemplo es la inhibición temporal del crecimiento durante un periodo de tiempo reducido, la cual es rápidamente compensada a medida que el organismo se desarrolla; en este caso, no se considera que el efecto altere de manera significativa la capacidad de supervivencia y reproducción del organismo, provocando así un impacto insignificante en la población receptora.

crónicos ideales son aquellos que evalúan los efectos que se extienden durante toda la vida o por múltiples generaciones de animales. Debido a que no siempre es posible contar con este tipo de estudios, también se tomó en consideración las pruebas que abarcaban una parte significativa de un periodo de vida o una etapa sensitiva (es decir, el periodo reproductivo o el periodo de desarrollo juvenil).

## **2.3 CONVERSIÓN DE LAS CONCENTRACIONES ALIMENTICIAS A VALORES DE CONSUMO DIARIOS**

El enfoque del coeficiente de peligro utilizado en la presente evaluación de riesgos requiere que los VRT se expresen en términos de consumo diario estandarizado a la masa corporal (es decir, miligramos por kilogramo-día [mg/kg-día]). Sin embargo, en muchos estudios experimentales, la exposición se expresa en términos de la concentración del contaminante en los alimentos o el agua administrada *ad libitum* (es decir, suministro ilimitado) a los organismos de prueba. En estos casos, los cálculos de las tasas de consumo de alimentos o agua debieron convertir la concentración alimenticia en ingesta diaria. En aquellos casos en los que la bibliografía original midió o calculó tales parámetros, estos se aplicaron directamente al cálculo de los VRT. Un segundo enfoque utilizó los datos sobre las tasas de consumo y el peso corporal de otros estudios que realizaron pruebas con las mismas especies y durante las mismas etapas de vida de los organismos. En aquellos casos en los que no se pudo llevar a cabo ninguno de estos dos métodos, se calculó las tasas de consumo utilizando los pesos corporales estimados o medidos así como una escala alométrica para obtener una tasa de consumo diario de alimentos.

## **2.4 FACTORES DE EXTRAPOLACIÓN**

En algunos casos, fue necesario el uso de factores de extrapolación para hacer frente al grado de incertidumbre generado por la escasez de datos. Los factores de extrapolación comúnmente utilizados en el proceso de derivación de los VRT de la fauna silvestre incluyen:

- Extrapolación de LOAEC a NOAEC – se multiplica un factor de extrapolación de 0.1 por la LOAEC para obtener la NOAEC (Sample et al., 1996).
- Extrapolación de subcrónico a crónico – se multiplica un factor de extrapolación de 10 por un VRT subcrónico para obtener un VRT crónico (Sample et al., 1996).
- Extrapolaciones entre especies – Es poco usual que existan datos de toxicidad para las especies receptoras de interés; por consiguiente, a menudo es necesario extrapolar los resultados de las pruebas de toxicidad de especies domésticas (por ejemplo, pollos, patos de collar) a receptores de fauna silvestre. Los factores de extrapolación entre especies no fueron aplicados, en términos de factores de aplicación (incertidumbre) o escalas alométricas con base en el peso corporal.

Tomando en cuenta las afirmaciones de Sample et al. (1996) y la guía preliminar del Ministerio del Medio Ambiente de Ontario (2009) emitida recientemente, no se garantiza la confiabilidad de la escala alométrica de datos de toxicidad.

## **2.5 CONVERSIONES QUÍMICAS**

En algunos casos, es necesario convertir la concentración o dosis total administrada a una exposición base de metales/metaloideos. En la mayoría de estudios de organismos vivos, los metales fueron administrados como sales metálicas solubles. La masa de sustancia considerada en el desarrollo del VRT fue la masa de iones metálicos (por ejemplo, aluminio en lugar del cloruro de aluminio). En algunos casos fue necesario adaptar la concentración total de sales a la concentración de iones metálicos.

### 3 ANÁLISIS TOXICOLÓGICO DE LOS ANFIBIOS

Los lineamientos de calidad del agua del Ministerio de Economía y Finanzas de Panamá y del Consejo Canadiense de Ministros de Medio Ambiente (CCME) se utilizaron con el fin de evaluar los riesgos para la vida acuática. Según estos lineamientos, se hizo posible identificar una lista de contaminantes de interés potencial (CIP) en la línea base y en casos de impacto para la vida acuática. A fin de investigar si las normas de calidad del agua que se utilizaron protegían a los anfibios, se llevó a cabo una revisión del material bibliográfico y se recopiló datos para un subgrupo de CIP (aluminio, arsénico, cobre, plomo y zinc).

Los datos relativos a la toxicidad se obtuvieron de las siguientes fuentes:

- base de datos bibliográfica de la toxicología de reptiles y anfibios (Pauli 2000);
- ecotoxicología de anfibios y reptiles (Sparling 2000, principalmente los capítulos de Birge 2000 y Linder y Grillitsch 2000);
- los informes en línea y borradores de las evaluaciones del riesgo ecológico los cuales utilizaron los valores de referencia de la toxicidad para los anfibios (VRT) (borrador Golder y Cantox 2006; URS 2006 borrador); y
- material bibliográfico científico principal.

Los datos principales no se revisaron si se encontraban incluidos en alguna de las fuentes secundarias arriba mencionadas. Los datos recopilados se revisaron con el fin de eliminar duplicidad, de establecer requerimientos de información adicional (es decir sin información sobre puntos finales o especies), o de corregir información presuntamente incorrecta (es decir errores de transcripción).

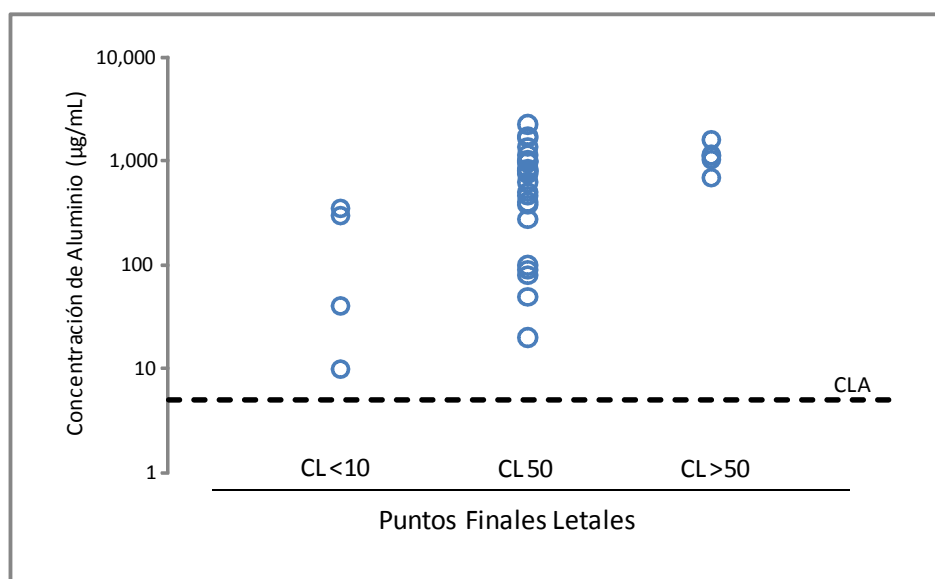
El conjunto de datos se enfocó en estudios de laboratorio de inmersión aguda y crónica con diversas especies de anfibios en diferentes etapas de sus vidas (es decir embrionaria, larval y adulta) y con duraciones de exposición. En los efectos se incluyó la mortalidad, desarrollo (por ejemplo retraso en la metamorfosis), conducta (por ejemplo evasión de depredadores, conducta de nado), reproducción (por ejemplo demora en la incubación) y malformaciones; sin embargo no se incluyó los efectos bioquímicos, celulares o fisiológicos (por ejemplo inducción enzimática). La cantidad de valores de toxicidad encontrado en la revisión del material bibliográfico para los CIP oscilaron entre 32 y 75 puntos de datos (aluminio: 40; arsénico: 32; cobre: 75; plomo: 37; zinc: 52).

En la Figura 1 se muestra para cada CIP, los datos de toxicidad recolectados de los anfibios correspondientes y se compara con las normas de la calidad del agua. En el caso del aluminio, arsénico y plomo, todos los valores de toxicidad estuvieron por

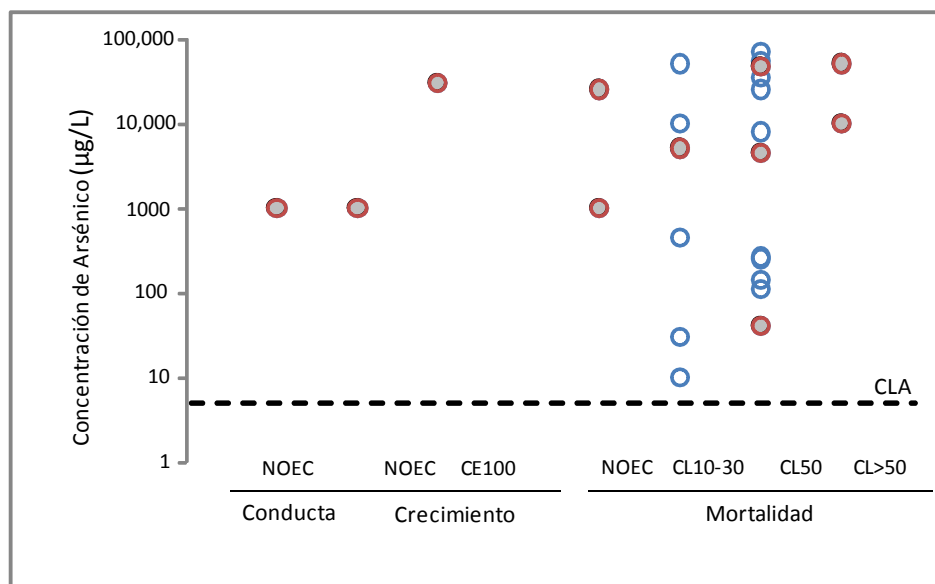
encima de las normas de la calidad del agua utilizados. En el caso del cobre y del zinc, los datos de un sólo estudio (Birge 2000) proporcionaron valores de toxicidad por debajo de las normas de calidad del agua; en consecuencia más del 95% de los estudios mostró que las normas de la calidad del agua protegen a los anfibios.

**Figura 1: Datos de Toxicidad de los Anfibios para su Comparación con las Normas de Calidad del Agua (NCA)**

**A- Aluminio**

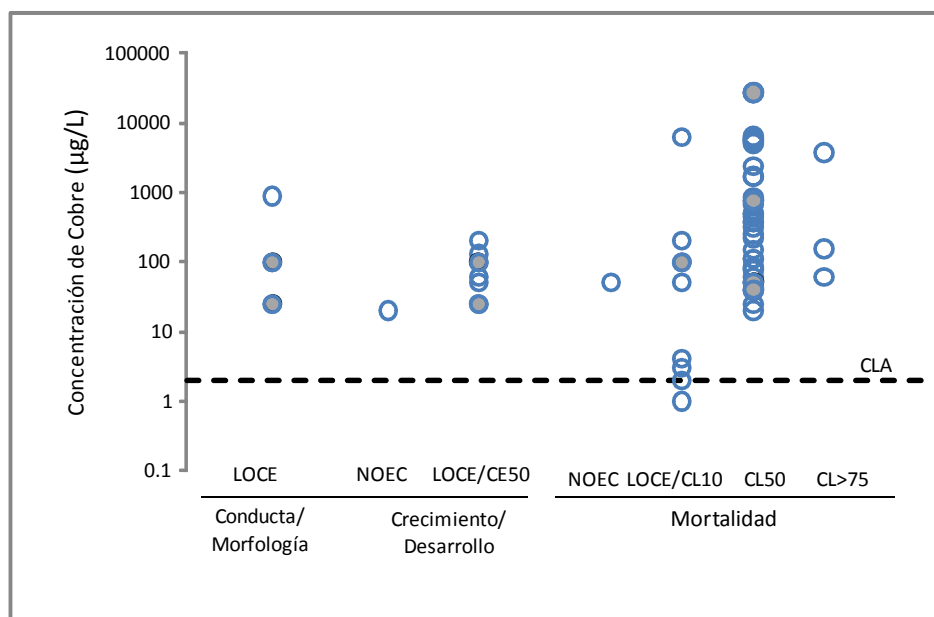


**B- Arsénico**

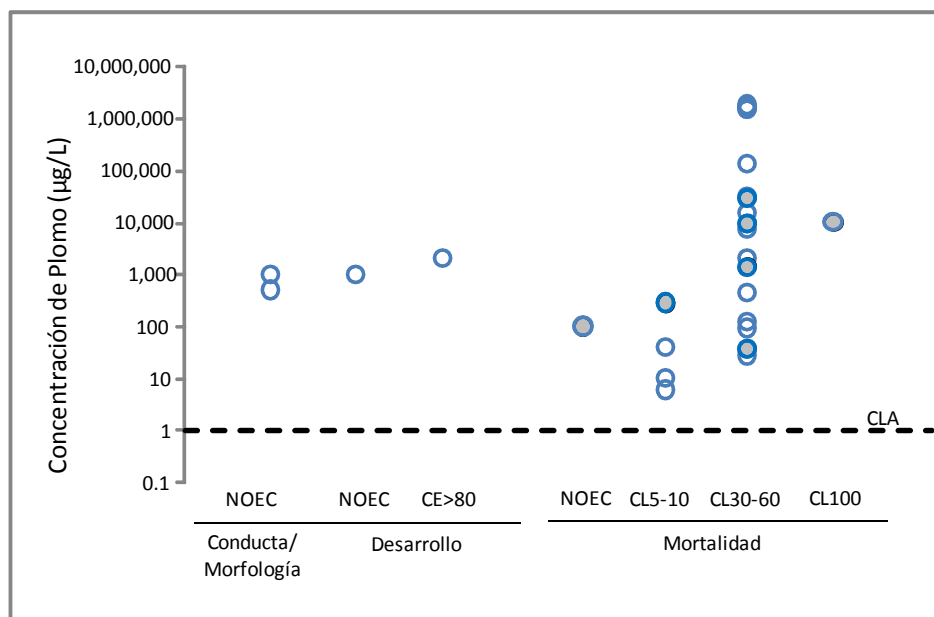


**Figura 1: Datos de Toxicidad de los Anfibios para su Comparación con las Normas de Calidad del Agua (NCA) (continuación)**

**C- Cobre**

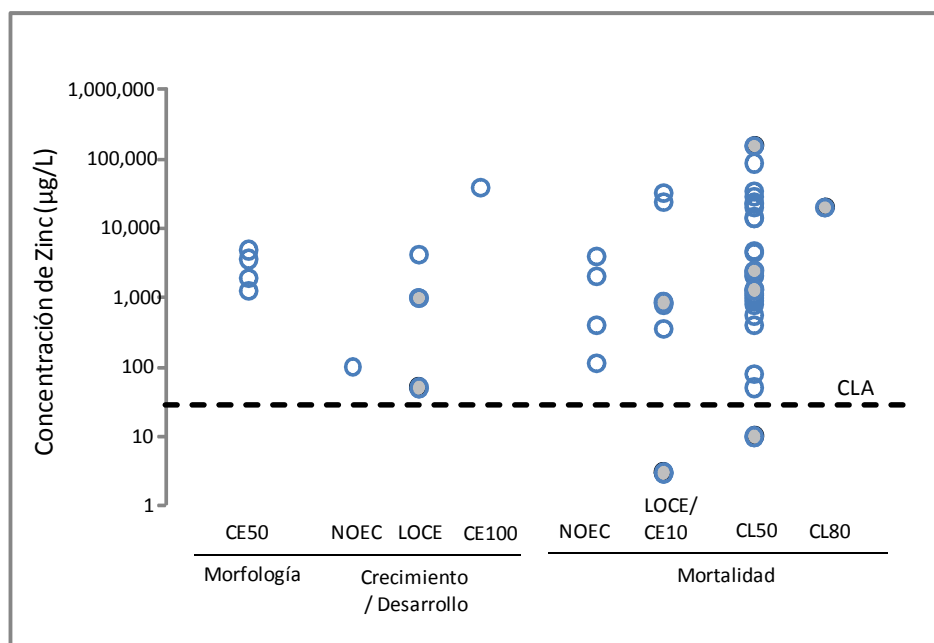


**D- Plomo**



**Figura 1: Datos de Toxicidad de los Anfibios para su Comparación con las Normas de Calidad del Agua (NCA) (continuación)**

E- Zinc



Notas: Los círculos rellenos representan períodos de exposición de 1 semana o más.

NOEC – concentración de efectos no observada

CL – concentración letal

CE – concentración de efectos



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**ANEXO XIX**

**APÉNDICE I**

**Evaluación de Riesgos de la Calidad del Aire**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

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## 1 DESCRIPCIÓN GENERAL

La Evaluación de Riesgo de la Calidad del Aire para la Salud Humana es una evaluación de la exposición a sustancias que se emiten al aire. Este apéndice contiene los métodos y resultados detallados de la Evaluación de Riesgo de la Calidad del Aire para la Salud Humana. La Sección 2.0 incluye la evaluación de los riesgos para la salud humana a corto plazo (agudos) (es decir, exposición de 1 hora y 24 horas) y la Sección 3.0 incluye la evaluación de riesgos para la salud humana a largo plazo (crónicos) para la exposición anual.

Se recogieron datos de monitoreo de la calidad del aire de línea base para material particulado y metales de Río Caimito y el campamento Colina. Sin embargo, los datos de monitoreo de la calidad del aire del campamento Colina estuvieron fuertemente influenciados por actividades previas al Proyecto, tales como la construcción de caminos, por lo tanto, las mediciones no se consideran representativas de las condiciones de línea base (ver Evaluación de Impacto de la Calidad del Aire, Capítulo 9, Sección 1.8). Por consiguiente, las mediciones de material particulado menores a  $10\text{ }\mu\text{m}$  ( $\text{PM}_{10}$ ) del campamento Colina no se han incluido en ninguna de las proyecciones de modelo. Debido a la ubicación alejada del Proyecto propuesto y la falta de desarrollo industrial cerca al puerto propuesto o las instalaciones de la mina, se consideró que los compuestos tales como  $\text{SO}_2$ ,  $\text{NO}_2$  y CO eran insignificantes y, por lo tanto, se asumió que las concentraciones de línea base eran cero.

El programa de monitoreo de la calidad del aire se concentró en el material particulado ( $\text{PM}_{10}$ ) debido a las fuentes existentes de PM en la comunidad tales como cocinas a leña, quema de vegetación y combustión limitada de combustibles. Se midieron concentraciones de  $\text{PM}_{10}$  elevadas durante el monitoreo en la comunidad de Río Caimito que posiblemente se debieron a la quema de vegetación y aerosoles de origen marino. No se midió concentraciones de material particulado menores a  $2.5\text{ }\mu\text{m}$  ( $\text{PM}_{2.5}$ ) en el programa de monitoreo de línea base. Por este motivo, MPSA se ha comprometido a llevar a cabo el monitoreo de  $\text{PM}_{2.5}$  en la comunidad de Río Caimito antes de la construcción del Proyecto para definir mejor las condiciones existentes. Independientemente de este compromiso, se han trasladado las concentraciones de  $\text{PM}_{2.5}$  previstas a la evaluación de impacto asumiendo un valor de fondo insignificante.

En consecuencia, los datos de línea base medidos no se utilizaron en la evaluación de riesgos para la salud humana y se previeron concentraciones anuales de línea base para utilizarse en la evaluación de salud crónica. No se dispone de concentraciones de línea base para la evaluación de salud aguda. Se previeron concentraciones de línea base anuales en el aire para metales a partir de los datos de monitoreo de la calidad de aire disponibles de Río Caimito. Los datos del monitoreo anual de  $\text{PM}_{10}$  de Río Caimito se escalaron de acuerdo a la población de cada una de las comunidades para

determinar la calidad del aire de línea base en cada ubicación. La calidad del aire de línea base en los alrededores del cerco perimétrico se determinó en base a la comunidad más cercana (es decir, San Benito para la mina y Río Caimito para el puerto). También se incluyó datos de la calidad del aire de línea base en los datos de caso de impacto para cada ubicación (Tabla 1-1).

Tabla 1-1      Resumen de las Concentraciones Anuales de Metales de Línea Base en el Aire

| Lugar           | Río Caimito | Nueva Lucha | Nuevo Sinaí | San Benito | Molejones | Coclesito | Alrededores del Cerco Perimétrico de la Mina | Alrededores del Cerco Perimétrico del Puerto |
|-----------------|-------------|-------------|-------------|------------|-----------|-----------|----------------------------------------------|----------------------------------------------|
| Parámetro       |             |             |             |            |           |           |                                              |                                              |
| Metales [µg/m³] |             |             |             |            |           |           |                                              |                                              |
| aluminio        | 3.00E-02    | 3.98E-02    | 4.64E-02    | 2.63E-02   | 2.32E-02  | 9.06E-02  | 2.63E-02                                     | 3.00E-02                                     |
| arsénico        | 1.10E-03    | 1.46E-03    | 1.70E-03    | 9.64E-04   | 8.52E-04  | 3.32E-03  | 9.64E-04                                     | 1.10E-03                                     |
| bario           | 3.75E-03    | 4.98E-03    | 5.81E-03    | 3.29E-03   | 2.90E-03  | 1.13E-02  | 3.29E-03                                     | 3.75E-03                                     |
| cadmio          | 3.35E-03    | 4.45E-03    | 5.19E-03    | 2.93E-03   | 2.59E-03  | 1.01E-02  | 2.93E-03                                     | 3.35E-03                                     |
| cromo           | 3.00E-04    | 3.98E-04    | 4.65E-04    | 2.63E-04   | 2.32E-04  | 9.07E-04  | 2.63E-04                                     | 3.00E-04                                     |
| cobalto         | 1.50E-03    | 1.99E-03    | 2.32E-03    | 1.31E-03   | 1.16E-03  | 4.53E-03  | 1.31E-03                                     | 1.50E-03                                     |
| cobre           | 3.30E-03    | 4.38E-03    | 5.11E-03    | 2.89E-03   | 2.56E-03  | 9.97E-03  | 2.89E-03                                     | 3.30E-03                                     |
| hierro          | 3.85E-02    | 5.11E-02    | 5.97E-02    | 3.38E-02   | 2.98E-02  | 1.16E-01  | 3.38E-02                                     | 3.85E-02                                     |
| plomo           | 5.03E-03    | 6.68E-03    | 7.79E-03    | 4.41E-03   | 3.90E-03  | 1.52E-02  | 4.41E-03                                     | 5.03E-03                                     |
| manganeso       | 1.00E-04    | 1.33E-04    | 1.55E-04    | 8.76E-05   | 7.74E-05  | 3.02E-04  | 8.76E-05                                     | 1.00E-04                                     |
| mercurio        | 3.50E-03    | 4.65E-03    | 5.42E-03    | 3.07E-03   | 2.71E-03  | 1.06E-02  | 3.07E-03                                     | 3.50E-03                                     |
| molibdeno       | 5.03E-03    | 6.67E-03    | 7.78E-03    | 4.40E-03   | 3.89E-03  | 1.52E-02  | 4.40E-03                                     | 5.03E-03                                     |
| níquel          | 7.38E-03    | 9.79E-03    | 1.14E-02    | 6.46E-03   | 5.71E-03  | 2.23E-02  | 6.46E-03                                     | 7.38E-03                                     |
| selenio         | 3.00E-04    | 3.98E-04    | 4.65E-04    | 2.63E-04   | 2.32E-04  | 9.07E-04  | 2.63E-04                                     | 3.00E-04                                     |
| vanadio         | 9.00E-04    | 1.19E-03    | 1.39E-03    | 7.88E-04   | 6.97E-04  | 2.72E-03  | 7.88E-04                                     | 9.00E-04                                     |
| zinc            | 4.40E-03    | 5.84E-03    | 6.81E-03    | 3.85E-03   | 3.41E-03  | 1.33E-02  | 3.85E-03                                     | 4.40E-03                                     |



## **2 MÉTODOS Y RESULTADOS DE LA EVALUACIÓN DE RIESGOS PARA LA SALUD HUMANA A CORTO PLAZO**

Se realizaron evaluaciones de los riesgos asociados con la exposición aguda (de 1 hora y 24 horas) para el caso de Impacto ya que no se disponía de datos de calidad del aire de línea base para la exposición aguda.

### **2.1 UMBRALES AGUDOS**

Se compararon concentraciones pico de 1 hora y 24 horas de COV, gases ácidos, metales y HAP con los umbrales agudos basados en la salud disponibles de los siguientes organismos:

- Organización Mundial de la Salud (OMS 2000; OMS 2005);
- Normas de Calidad del Aire de Panamá (Autoridad Nacional del Aire Ambiental de Panamá, 2006);
- Agency of Toxic Substances and Disease Registry (Agencia para el Registro de Sustancias Tóxicas y Enfermedades) (ASTDR 2010, sitio de Internet);
- California Office of Environmental Health Hazard Assessment (Oficina de Evaluación de Peligros Ambientales para la Salud de California) (OEHHA 2008, sitio de Internet);
- Ontario Ministry of Environment and Energy (Ministerio del Medio Ambiente y Energía de Ontario) (OMEE 2005; OMEE 2008); y
- Texas Commission on Environmental Quality (Comisión de Calidad Ambiental de Texas) (TCEQ 2010, sitio de Internet).

Se utilizó la siguiente jerarquía para seleccionar el umbral agudo empleado en la evaluación de riesgos: 1) Panamá 2) OMS, 3) ATSDR, 4) OEHHA, 5) OMEE y 6) TCEQ. Se utilizó principalmente umbrales con puntos finales basados en la salud y se emplearon otros puntos finales tales como el olor sólo en caso de ausencia de puntos finales basados en la salud. En casos en los que no se disponía de estándares de calidad de aire agudos de 1 hora, se utilizó estándares de calidad de 24 horas de manera conservadora como sustitutos para fines de análisis. En casos en los que no se disponía de un estándar agudo de 24 horas, se utilizó un estándar de aire anual de manera conservadora para fines de análisis.

En las Tablas 2-1 y 2-2 se presentan los umbrales de 1 hora y 24 horas basados en la salud y las bases de estos umbrales, respectivamente.

Tabla 2-1      Umbrales de Inhalación Aguda de 1 Hora Basados en la Salud

| Parámetro               | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá<br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gases Ácidos            |                                 |                                |                                 |                                |                               |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| monóxido de carbono     | n/d                             | 36,200                         | 23,000                          | n/d                            | 30,000                        | n/d               | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en los efectos de angina producidos en personas con enfermedades cardiovasculares conocidas y que se ejercitan en exceso. El umbral de la OMS se basa en la ecuación exponencial Coburn-Foster-Kane que toma en cuenta las variables fisiológicas conocidas que afectan la absorción de monóxido de carbono. El umbral se determinó de manera que no se exceda el nivel de carboxihemoglobina (CoHb) de 2.5%, incluso si una persona se ejercita en forma leve o moderada. |
| dióxido de nitrógeno    | n/d                             | 400                            | 470                             | n/d                            | 200                           | n/d               | El umbral del OMEE se basa en efectos sobre la salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en una mayor reactividad de las vías respiratorias en asmáticos. El umbral de la OMS se basa en una mayor respuesta bronquial en asmáticos.                                                                                                                                                                                                                                                                                                                                 |
| dióxido de azufre       | n/d                             | 690                            | 660                             | n/d                            | n/d                           | n/d               | El umbral del OMEE se basa en efectos sobre la salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en el deterioro de la función de las vías respiratorias en asmáticos                                                                                                                                                                                                                                                                                                                                                                                                        |
| HAP                     |                                 |                                |                                 |                                |                               |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| acenafteno              | n/d                             | n/d                            | n/d                             | 1                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| acenaftileno            | n/d                             | n/d                            | n/d                             | 1                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| antraceno               | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, se encuentra actualmente en revisión y sujeto a cambios.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| benzo(a)fluoreno        | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ para benzo(a,b)fluoreno se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| benzo(a)pireno          | n/d                             | n/d                            | n/d                             | 0.03                           | n/d                           | n/d               | El umbral de la TCEQ para benzo(a)pireno se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| benzo(b,j,k)fluoranteno | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, se encuentra actualmente en revisión y sujeto a cambios.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| benzo(e)pireno          | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| benzo(g,h,i) perileno   | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| criseno                 | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ para criseno se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| dibenzo(a,h)antraceno   | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Tabla 2-1      Umbrales de Inhalación Aguda de 1 Hora Basados en la Salud (continuación)

| Parámetro                | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá<br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dibenzotiofeno           | n/d                             | n/d                            | n/d                             | 25                             | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| fluoranteno              | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| fluoreno                 | n/d                             | n/d                            | n/d                             | 10                             | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| indeno (1,2,3) cd pireno | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| naftaleno                | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d               | No se cuenta con un umbral basado en un punto final de salud. Se utilizó un umbral de 24 horas (22.5 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                                                                                            |
| fenantreno               | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| pireno                   | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| COV                      |                                 |                                |                                 |                                |                               |                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| acetaldehído             | n/d                             | n/d                            | 470                             | n/d                            | n/d                           | n/d               | El umbral de la OEHHA se basa en un LOAEL de un estudio con humanos. Los efectos críticos del estudio incluyen irritación sensorial de los bronquios, ojos, nariz y garganta.                                                                                                                                                                                                                                                                                                  |
| acroleína                | 6.9 <sup>(f)</sup>              | n/d                            | 2.5                             | 2.3                            | n/d                           | n/d               | El umbral de la ATSDR se basa en el LOAEL para una disminución de la frecuencia respiratoria e irritación de la nariz y garganta en un estudio con humanos voluntarios. Se modificó el LOAEL para exposición intermitente y se aplicó un factor de incertidumbre. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basó en el LOAEL para irritación ocular subjetiva en humanos voluntarios. |
| benceno                  | n/d                             | n/d                            | n/d                             | 170                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| etilbenceno              | n/d                             | n/d                            | n/d                             | 2,000                          | n/d                           | n/d               | No se cuenta con un umbral basado en un punto final de salud. El umbral de la TCEQ se basa en el olor.                                                                                                                                                                                                                                                                                                                                                                         |
| formaldehído             | n/d                             | n/d                            | 55                              | 15                             | n/d                           | n/d               | El umbral de la OEHHA se basa en la concentración de punto de referencia basada en la respuesta a la dosis para irritación ocular en humanos. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                        |
| propileno                | n/d                             | n/d                            | n/d                             | 8,750                          | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                      |
| tolueno                  | n/d                             | n/d                            | 37,000                          | n/d                            | n/d                           | n/d               | El umbral de la OEHHA se basa en los siguientes efectos: dolores de cabeza, mareos y leve irritación nasal y ocular.                                                                                                                                                                                                                                                                                                                                                           |

Tabla 2-1      Umbrales de Inhalación Aguda de 1 Hora Basados en la Salud (continuación)

| Parámetro      | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá<br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| xilenos        | n/d                             | n/d                            | 22,000                          | n/d                            | n/d                           | n/d               | El umbral de la OEHHA se basa en un LOAEL (860,000 µg/m³) para irritación de ojos, nariz y garganta en humanos expuestos por espacio de 30 minutos. El LOAEL se extrapoló a 1 hora (217,000 µg/m³) y se aplicó un factor de incertidumbre de 10 para diferencias intraespecies.                                                                                                                         |
| <b>Metales</b> |                                 |                                |                                 |                                |                               |                   |                                                                                                                                                                                                                                                                                                                                                                                                         |
| aluminio       | n/d                             | n/d                            | n/d                             | 50                             | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| antimonio      | n/d                             | n/d                            | n/d                             | 5                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| arsénico       | n/d                             | n/d                            | 0.2                             | 0.1                            | n/d                           | n/d               | El umbral de la OEHHA es para un período de exposición de 4 horas basado en un LOAEL para disminución del peso fetal en ratones. Se aplicó un factor de incertidumbre de 1,000 al LOAEL; 10 por la extrapolación de animales a humanos, 10 por sujetos sensibles y 10 por el uso de un LOAEL. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. |
| bario          | n/d                             | n/d                            | n/d                             | 5                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| cadmio         | n/d                             | n/d                            | n/d                             | 0.1                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| cromo          | n/d                             | n/d                            | n/d                             | 1                              | n/d                           | n/d               | El umbral de la TCEQ para metal de cromo se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                           |
| cromo vi       | n/d                             | n/d                            | n/d                             | 0.1                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| cobalto        | n/d                             | n/d                            | n/d                             | 0.2                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |
| cobre          | n/d                             | n/d                            | 100                             | 10                             | n/d                           | n/d               | El umbral de la OEHHA se basa en el NOAEL para fiebre de los vapores metálicos en los trabajadores. Se aplicó un factor de incertidumbre de 10 al NOAEL por sujetos sensibles. El umbral de la TCEQ para polvo y niebla de cobre se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                   |
| hierro         | n/d                             | n/d                            | n/d                             | 10                             | n/d                           | n/d               | El umbral de la TCEQ es para hierro (sales solubles) y se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                             |
| plomo          | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d               | No se cuenta con un umbral de 1 hora. Se utilizó el umbral de 24 horas (0.5 µg/m³) del OMEE de manera conservadora.                                                                                                                                                                                                                                                                                     |
| manganeso      | n/d                             | n/d                            | n/d                             | 2                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                               |

Tabla 2-1      Umbrales de Inhalación Aguda de 1 Hora Basados en la Salud (continuación)

| Parámetro | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá<br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mercurio  | n/d                             | n/d                            | 0.6                             | 0.25                           | n/d                           | n/d               | El umbral de la OEHHA se basa en efectos sobre el sistema nervioso y el desarrollo. El umbral de la TCEQ para mercurio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                      |
| molibdeno | n/d                             | n/d                            | n/d                             | 50                             | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                        |
| níquel    | n/d                             | n/d                            | 6                               | 0.15                           | n/d                           | n/d               | El umbral de la OEHHA se basa en un LOAEL (67 µg/m³) para efectos en el aparato respiratorio y sistema inmune percibidos por trabajadores expuestos al níquel por 30 minutos. Se convirtió el LOAEL a 1 hora de exposición y se aplicó un factor de 10 por la incertidumbre del LOAEL. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. |
| selenio   | n/d                             | n/d                            | n/d                             | 2                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                        |
| plata     | n/d                             | n/d                            | n/d                             | 0.1                            | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                        |
| estroncio | n/d                             | n/d                            | n/d                             | 20                             | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                        |
| talio     | n/d                             | n/d                            | n/d                             | 1                              | n/d                           | n/d               | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                        |
| titanio   | n/d                             | n/d                            | n/d                             | 50                             | n/d                           | n/d               | El umbral de la TCEQ para dióxido de titanio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                |
| uranio    | n/d                             | n/d                            | n/d                             | 0.5                            | n/d                           | n/d               | El umbral de la TCEQ para uranio soluble se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                    |
| vanadio   | n/d                             | n/d                            | 30                              | 0.5                            | n/d                           | n/d               | El umbral de la OEHHA se basa en una mayor producción de mucosidad en humanos. El umbral de la TCEQ para pentóxido de vanadio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                               |
| zinc      | n/d                             | n/d                            | n/d                             | 50                             | n/d                           | n/d               | El umbral de la TCEQ para vapores o polvo de zinc se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                           |

(a) Agency for Toxic Substances & Disease Registry (Agencia para el Registro de Sustancias Tóxicas y Enfermedades) (ASTDR 2010, sitio de Internet);

(b) Ontario Ministry of Energy and the Environment (Ministerio de Medio Ambiente y Energía de Ontario) (OMEE 2005; OMEE 2008)

(c) California Office of Environmental Health Hazard Assessment (Oficina de Evaluación de Peligros Ambientales para la Salud de California) (OEHHA 2008, sitio de Internet);

(d) Texas Commission on Environmental Quality (Comisión de Calidad Ambiental de Texas) (TCEQ 2009, sitio de Internet).

(e) Organización Mundial de la Salud (OMS 2000; OMS 2005).

(f) Autoridad Nacional del Aire Ambiental de Panamá, 2006 n/d = No disponible.

Notas: Se utilizaron umbrales agudos sombreados y en negrita en la evaluación de riesgos. Se utilizó la siguiente jerarquía para seleccionar el umbral empleado en el análisis de datos y la evaluación de riesgos: 1) OMS, 2) ATSDR, 3) OEHHA, 4) OMEE, y 5) TCEQ.

Tabla 2-2      Umbrales de Inhalación Aguda de 24 Horas Basados en la Salud

| Parámetro                   | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá <sup>(m)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Material Particulado</b> |                                 |                                |                                 |                                |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                 |
| PM <sub>2.5</sub>           | n/d                             | n/d                            | n/d                             | n/d                            | 25                            | n/d                              | El umbral de la OMS se basa en los niveles más bajos en los que se ha demostrado un aumento de la mortalidad total, cardiopulmonar y de cáncer al pulmón con más de 95% de certeza en respuesta a una exposición a material particulado a largo plazo. El valor de 24 horas se infirió a partir de los niveles anuales.                                                                         |
| PM <sub>10</sub>            | n/d                             | n/d                            | n/d                             | n/d                            | 50                            | 150                              | El umbral de la OMS se basa en los niveles más bajos en los que se ha demostrado un aumento de la mortalidad total, cardiopulmonar y de cáncer al pulmón con más de 95% de certeza en respuesta a una exposición a material particulado a largo plazo. El valor de 24 horas se infirió a partir de los niveles anuales. El umbral de Panamá no cuenta con documentación de respaldo disponible. |
| PTS                         | n/d                             | 120                            | n/d                             | n/d                            | n/d                           | 360                              | El umbral del OMEE se basa en la visibilidad; no se cuenta con punto final de salud. El estándar panameño es para la generación térmica de electricidad; sin embargo, no se cuenta con documentación de respaldo.                                                                                                                                                                               |
| <b>Gases Ácidos</b>         |                                 |                                |                                 |                                |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                 |
| monóxido de carbono         | n/d                             | 5,233 <sup>(f)</sup>           | n/d                             | n/d                            | 3,333 <sup>(g)</sup>          | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OMS es una media ponderada en el tiempo determinada de manera que no se exceda el nivel de 2.5% de carboxihemoglobina (umbral para el efecto en la salud humana).                                                                                                       |
| dióxido de nitrógeno        | n/d                             | 200                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en efectos sobre la salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                          |
| dióxido de azufre           | n/d                             | 275                            | n/d                             | n/d                            | 125                           | n/d                              | El umbral del OMEE se basa en efectos sobre la salud y vegetación, pero no se cuenta con documentación de respaldo. El umbral de la OMS se basa en estudios epidemiológicos que muestran efectos respiratorios, pulmonares y de mortalidad.                                                                                                                                                     |
| <b>HAP</b>                  |                                 |                                |                                 |                                |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                 |
| acenafteno                  | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.1 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                               |
| acenaftileno                | n/d                             | 3.5                            | n/d                             | n/d                            | n/d                           | n/d                              | El nivel de análisis de OMEE para acenaftileno se basa en límites jurisdiccionales promedio <sup>(i)</sup> .                                                                                                                                                                                                                                                                                    |
| antraceno                   | n/d                             | 0.2                            | n/d                             | n/d                            | n/d                           | n/d                              | El nivel de análisis de OMEE para antraceno se basa en límites jurisdiccionales promedio <sup>(i)</sup> .                                                                                                                                                                                                                                                                                       |
| benzo(a)fluoreno            | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ para benzo (a,b) fluoreno (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                    |
| benzo(a)pireno              | n/d                             | 0.0011                         | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con información de respaldo.                                                                                                                                                                                                                                                                                           |
| benzo(b,j,k)fluoranteno     | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| benzo(e)pireno              | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| benzo(g,h,i) perileno       | n/d                             | 1.2                            | n/d                             | n/d                            | n/d                           | n/d                              | El nivel de análisis del OMEE se basa en límites jurisdiccionales promedio <sup>(i)</sup> .                                                                                                                                                                                                                                                                                                     |
| criseno                     | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| dibenzo(a,h)antraceno       | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la US EPA (0.008 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                           |
| dibenzotiofeno              | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (2.5 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                               |
| fluoranteno                 | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| fluoreno                    | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (1 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                                 |
| indeno (1,2,3) cd pireno    | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| naftaleno                   | n/d                             | 22.5                           | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con información de respaldo.                                                                                                                                                                                                                                                                                           |
| fenantreno                  | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                              |
| pireno                      | n/d                             | 0.2                            | n/d                             | n/d                            | n/d                           | n/d                              | El nivel de análisis del OMEE se basa en límites jurisdiccionales promedio <sup>(i)</sup> .                                                                                                                                                                                                                                                                                                     |
| <b>COV</b>                  |                                 |                                |                                 |                                |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                 |

Tabla 2-2      Umbrales de Inhalación Aguda de 24 Horas Basados en la Salud (continuación)

| Parámetro    | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá <sup>(m)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| benceno      | 7.18 <sup>(h)</sup>             | n/d                            | 325 <sup>(i)</sup>              | n/d                            | n/d                           | n/d                              | El nivel de riesgo mínimo de la ATSDR se basó en el LOAEL para disminución de linfocitos en ratones. El LOAEL se ajustó de manera conservadora de 6 horas para una exposición de 6 días a una exposición de 24 horas y se aplicó un factor de incertidumbre de 300; 10 por el uso de un LOAEL, 3 por la extrapolación de animales a humanos y 10 por sujetos sensibles. El umbral de la OEHHA se basa en efectos sobre la salud (toxicidad reproductiva y del desarrollo).                                            |
| tolueno      | 943 <sup>(i)</sup>              | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral de la ATSDR se basa en un NOAEL para efectos neurológicos en adultos expuestos al tolueno por 6 hrs/día. El NOAEL se ajustó de manera conservadora para una exposición de 24 horas y se aplicó un factor de incertidumbre de 10.                                                                                                                                                                                                                                                                            |
| etilbenceno  | 14,467 <sup>(k)</sup>           | 1,000                          | n/d                             |                                | n/d                           | n/d                              | El umbral de la ATSDR se basa en un NOAEL para daño auditivo en ratas expuestas 8 hrs/día, durante 5 días. El NOAEL se convirtió de manera conservadora a una exposición de 24 horas y se aplicó un factor de incertidumbre de 30. El umbral del OMEE se basa en un punto final de salud; sin embargo, no se cuenta con documentación de respaldo.                                                                                                                                                                    |
| xilenos      | n/d                             | 730                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud (efectos neurológicos). El umbral se deriva de un estudio ocupacional en humanos en el que trabajadores de una fábrica de botas de caucho, de alambres con recubrimiento de plástico y de operaciones de impresión fueron expuestos a una concentración promedio anual de 62 mg/m³ de xileno durante siete años. Algunos trabajadores mostraron signos de irritación de ojos, garganta y sensación de flotación, así como disminución del apetito (OMEE, 2005). |
| acetaldehído | n/d                             | 500                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un efecto sobre la salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                              |
| acroleína    | n/d                             | 0.08                           | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un efecto sobre la salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                              |
| formaldehído | n/d                             | 65                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| propileno    | n/d                             | 4,000                          | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud; sin embargo, no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                       |
| Metales      |                                 |                                |                                 |                                |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| aluminio     | n/d                             | 120                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE para estearato de aluminio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                    |
| antimonio    | n/d                             | 25                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| arsénico     | n/d                             | 0.3                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| bario        | n/d                             | 10                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| bromo        | n/d                             | 20                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| cadmio       | n/d                             | 0.025                          | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| cromo        | n/d                             | 1.5                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE para cromo III y II se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                           |
| cromo vi     | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la US EPA (0.0001 µg/m³) de manera conservadora.                                                                                                                                                                                                                                                                                                                                                                                                |
| cobalto      | n/d                             | 0.1                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| cobre        | n/d                             | 50                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| hierro       | n/d                             | 4                              | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE es para hierro metálico y se basa en un punto final de contaminación; no se cuenta con un umbral basado en un punto final de salud.                                                                                                                                                                                                                                                                                                                                                                |
| plomo        | n/d                             | 0.5                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en efectos neurológicos en niños (OMEE 2007).                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| manganeso    | n/d                             | 2.5                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE para estearato de magnesio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                    |
| mercurio     | n/d                             | 2                              | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                               |
| molibdeno    | n/d                             | 120                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de partículas, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                          |

Tabla 2-2      Umbrales de Inhalación Aguda de 24 Horas Basados en la Salud (continuación)

| Parámetro | ATSDR <sup>(a)</sup><br>[µg/m³] | OMEE <sup>(b)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OMS <sup>(e)</sup><br>[µg/m³] | Panamá <sup>(m)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                  |
|-----------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| níquel    | n/d                             | 2                              | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE no se basa en un punto final de vegetación; sin embargo, no se cuenta con un punto final de salud.                                                                                                                                                                            |
| paladio   | n/d                             | 10                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                          |
| selenio   | n/d                             | 10                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                          |
| plata     | n/d                             | 1                              | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                          |
| estroncio | n/d                             | 120                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de partículas, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                     |
| talio     | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.1 µg/m³) de manera conservadora.                                                                                                                                                                                |
| estaño    | n/d                             | 10                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                          |
| titanio   | n/d                             | 34                             | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE para dióxido de titanio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                  |
| uranio    | n/d                             | n/d                            | n/d                             | n/d                            | n/d                           | n/d                              | No se cuenta con un umbral de 24 horas. Se utilizó un umbral anual de la TCEQ (0.05 µg/m³) de manera conservadora.                                                                                                                                                                               |
| vanadio   | n/d                             | 2                              | n/d                             | n/d                            | 1                             | n/d                              | El umbral del OMEE se basa en un punto final de salud (no se cuenta con documentación de respaldo). El umbral de la OMS se basa en un LOAEL (20 µg/m³) para síntomas de las vías respiratorias en estudios ocupacionales. Se aplicó un factor de protección de 20 para poblaciones susceptibles. |
| zinc      | n/d                             | 120                            | n/d                             | n/d                            | n/d                           | n/d                              | El umbral del OMEE se basa en un punto final de partículas, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                     |

(a) Agency for Toxic Substances & Disease Registry (Agencia para el Registro de Sustancias Tóxicas y Enfermedades) (ASTDR 2010) (sitio de Internet).

(b) Ontario Ministry of Energy and the Environment (Ministerio de Medio Ambiente y Energía de Ontario) (OMEE 2005; OMEE 2008)

(c) California Office of Environmental Health Hazard Assessment (Oficina de Evaluación de Peligros Ambientales para la Salud de California) (OEHHA 2008) (sitio de Internet).

(d) Texas Commission on Environmental Quality (Comisión de Calidad Ambiental de Texas) (TCEQ 2009) (sitio de Internet).

(e) Organización Mundial de la Salud (OMS 2000; OMS 2005).

(f) El umbral de la OMS para monóxido de carbono se basó en 8 horas de exposición (10,000 µg/m³). Este valor se convirtió a 24 horas de exposición utilizando la siguiente ecuación (8/24 x 10,000 = 3,333 µg/m³).

(g) El umbral del OMEE para monóxido de carbono se basó en 8 horas de exposición (15,700 µg/m³). Este valor se convirtió a 24 horas de exposición utilizando la siguiente ecuación (8/24 x 15,700 = 5,233 µg/m³).

(h) El umbral de la ATSDR para benceno (0.009 ppm) se convirtió a µg/m³: 1 ppm = 3,190 µg/m³; el valor también se convirtió a 24 horas utilizando el siguiente cálculo 6/24 x 28.71 µg/m³= 7.18 µg/m³).

(i) El umbral de la OEHHA para benceno (1,300 µg/m³) se basa en 6 horas de exposición. Este valor se convirtió a 24 horas de exposición utilizando la siguiente ecuación (6/24 x1,300 µg/m³= 325 µg/m³).

(j) El umbral de la ATSDR para tolueno (1 ppm) se convirtió a µg/m³: 1 ppm = 3,770 µg/m³; el valor también se convirtió a 24 horas de exposición utilizando el siguiente cálculo 6/24 x 3,770 µg/m³= 943 µg/m³).

(k) El umbral de la ATSDR para etilbenceno (10 ppm) se convirtió a µg/m³: 1 ppm = 4,340 µg/m³; el valor también se convirtió a 24 horas de exposición utilizando el siguiente cálculo 8/24 x 43,400 µg/m³= 14,467 µg/m³).

(l) Ministerio de Medio Ambiente de Ontario, Lista Jurisdiccional de Niveles de Análisis, febrero, 2008; los límites jurisdiccionales promedio de aire ambiental son desarrollados por el Ministerio de Medio Ambiente de Ontario utilizando niveles de análisis de 10 agencias (internacionales, estadounidenses y canadienses). Los niveles de análisis se ajustaron para cumplir con las prácticas estándar en Ontario. Todos los límites jurisdiccionales se convirtieron a 24 horas promediando los periodos mediante los factores de conversión estándar utilizados en el proceso de establecimiento de estándares de aire. De la lista convertida, se eligió el límite jurisdiccional promedio para cada contaminante.

(m) Autoridad Nacional del Aire Ambiental de Panamá, 2006.

Notas: n/d = No disponible.

Se utilizaron umbrales agudos sombreados y en negrita en la evaluación de riesgos. Se utilizó la siguiente jerarquía para seleccionar el umbral empleado en el análisis de datos y la evaluación de riesgos: 1) OMS, 2) ATSDR, 3) OEHHA, 4) OMEE, y 5) TCEQ.



### **2.1.1 Comparación de Concentraciones en el Aire de Corto Plazo con Umbrales Agudos**

Se compararon las concentraciones de 1 hora y 24 horas en el aire previstas para el Caso de Impacto con los umbrales agudos elegidos (Tablas 2-3 y 2-4, respectivamente). Se conservó un parámetro para su posterior evaluación por si una concentración pico prevista de alguna ubicación era mayor al umbral agudo del aire. Un parámetro que se conserva para una futura evaluación se considera un Químico de Interés Potencial (QIP) (Sección 1.1.3).

### **2.1.2 Evaluación de Riesgo Agudo de la Calidad del Aire**

Se realizaron evaluaciones de los riesgos asociados a la exposición aguda a QIP y los resultados se presentan a continuación. Para cada QIP, se calculó un cociente de riesgo (CR) por cada ubicación receptora. Un CR es la proporción entre la exposición que probablemente tenga la persona y el valor de toxicidad de referencia (es decir, la concentración del umbral agudo) que se muestra en la siguiente ecuación.

$$CR = \text{concentración de QIP en el aire } (\mu\text{g}/\text{m}^3) / \text{Concentración del Umbral Agudo } (\mu\text{g}/\text{m}^3)$$

Un valor de CR mayor a uno indica que la exposición es mayor que el umbral. Para parámetros y ubicaciones en los que los valores de CR son mayores que uno, se realiza un mayor análisis para determinar la magnitud del efecto. Se realizaron los siguientes pasos de análisis para determinar si el proyecto tiene un efecto insignificante, bajo, moderado o alto en el potencial de exposiciones agudas aceptables:

- comparación de las concentraciones máximas de los percentiles 95 y 75 en el aire con el rango de umbrales agudos disponibles;
- evaluación del conservadurismo del enfoque de modelamiento de aire utilizado para prever concentraciones futuras;
- evaluación del conservadurismo de los umbrales agudos para ese parámetro; y
- evaluación de los posibles efectos en la salud a corto plazo que pueden ocurrir en las concentraciones previstas.

Las Tablas 2-5 y 2-6 muestran los valores de CR para concentraciones pico de 1 hora y 24 horas, respectivamente, en las comunidades regionales. Las concentraciones pico de una hora exceden los umbrales agudos para dióxido de nitrógeno, cobre y hierro sólo en los alrededores del cerco perimétrico. Las concentraciones pico de veinticuatro horas excedieron los umbrales agudos para material particulado (sólo en los alrededores del cerco perimétrico), acroleína (en San Benito y alrededores del cerco perimétrico), cromo (VI) (en Río Caimito y alrededores del cerco perimétrico) y hierro (sólo en los alrededores del cerco perimétrico).

Tabla 2-3      Análisis de las Concentraciones de 1 Hora en el Aire Para la Evaluación del Caso de Impacto en la Salud Humana y Riesgo Ecológico Para el Proyecto de Cobre de MPSA

| Parámetro                | Umbral de 1 Hr | Río Caimito | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Molejones   | Coclesito | Alrededores del Cerco Perimétrico | ¿Conservar Como QIP de Aire? |
|--------------------------|----------------|-------------|----------|-------------|-----------|-------------|------------|-------------|-----------|-----------------------------------|------------------------------|
| Gases Ácidos             |                |             |          |             |           |             |            |             |           |                                   |                              |
| CO                       | 30,000         | 44.377      | 42.956   | 94.134      | 181.37    | 149.11      | 507.62     | 142.57      | 60.697    | 1844.7                            | No                           |
| NO <sub>2</sub>          | 200            | 42.69       | 36.779   | 65.16395    | 75.07185  | 70.70985    | 112.3058   | 72.44184831 | 62.877149 | 266.682844                        | Sí                           |
| SO <sub>2</sub>          | 660            | 34.423      | 11.579   | 23.214      | 47.144    | 35.409      | 112.01     | 37.6020012  | 15.025    | 415.640015                        | No                           |
| HAP                      |                |             |          |             |           |             |            |             |           |                                   |                              |
| acenafteno               | 1              | 8.21E-05    | 8.32E-05 | 0.000166    | 0.000341  | 0.000252    | 0.000795   | 0.00027326  | 0.0001077 | 0.0029599                         | No                           |
| acenaftileno             | 1              | 0.000298    | 0.000302 | 0.000602    | 0.001237  | 0.000915    | 0.002887   | 0.0009925   | 0.0003911 | 0.010751                          | No                           |
| antraceno                | 0.5            | 5.32E-05    | 5.39E-05 | 0.000107    | 0.000221  | 0.000163    | 0.000515   | 0.00017698  | 6.973E-05 | 0.001917                          | No                           |
| benzo(a)fluoreno         | 0.5            | 1.61E-05    | 1.63E-05 | 3.24E-05    | 6.66E-05  | 4.93E-05    | 0.000155   | 5.3435E-05  | 2.105E-05 | 0.0005788                         | No                           |
| benzo(a)pireno           | 0.03           | 7.02E-06    | 7.12E-06 | 1.42E-05    | 2.91E-05  | 2.16E-05    | 6.8E-05    | 2.3378E-05  | 9.211E-06 | 0.00025322                        | No                           |
| bbenzo(b,j,k)fluoranteno | 0.5            | 6.56E-05    | 6.65E-05 | 0.000133    | 0.000272  | 0.000201    | 0.000635   | 0.00021837  | 8.604E-05 | 0.0023654                         | No                           |
| benzo(e)pireno           | 0.5            | 9.94E-07    | 1.01E-06 | 2.01E-06    | 4.12E-06  | 3.05E-06    | 9.62E-06   | 3.3074E-06  | 1.303E-06 | 3.5825E-05                        | No                           |
| benzo(g,h,i) perileno    | 0.5            | 1.61E-05    | 1.63E-05 | 3.25E-05    | 6.67E-05  | 4.94E-05    | 0.000156   | 5.3532E-05  | 2.109E-05 | 0.00057985                        | No                           |
| criseno                  | 0.5            | 1.42E-05    | 1.44E-05 | 2.88E-05    | 5.91E-05  | 4.37E-05    | 0.000138   | 0.000047431 | 1.869E-05 | 0.00051376                        | No                           |
| dibenzo(a,h)antraceno    | 0.5            | 1.84E-05    | 1.87E-05 | 3.72E-05    | 7.64E-05  | 5.65E-05    | 0.000178   | 6.1299E-05  | 2.415E-05 | 0.00066398                        | No                           |
| dibenzotiofeno           | 25             | 0.000137    | 1.23E-05 | 2.04E-05    | 2.95E-05  | 5.33E-05    | 0.000158   | 4.8427E-05  | 2.206E-05 | 0.001649                          | No                           |
| fluoranteno              | 0.5            | 0.00024     | 0.000234 | 0.000457    | 0.000936  | 0.000692    | 0.002183   | 0.00075826  | 0.000296  | 0.0081281                         | No                           |
| fluoreno                 | 10             | 0.000425    | 0.00043  | 0.000858    | 0.001761  | 0.001303    | 0.004111   | 0.001413    | 0.0005567 | 0.015305                          | No                           |
| indeno (1,2,3) cd pireno | 0.5            | 9.96E-07    | 1.09E-07 | 1.61E-07    | 1.53E-07  | 1.97E-07    | 1.04E-07   | 1.0225E-07  | 8.425E-08 | 3.0518E-06                        | No                           |
| naftaleno                | 22.5           | 0.006484    | 0.006493 | 0.012871    | 0.026412  | 0.019541    | 0.061634   | 0.021248    | 0.0083498 | 0.22947                           | No                           |
| fenantreno               | 0.5            | 0.000814    | 0.000433 | 0.000808    | 0.001648  | 0.001216    | 0.003836   | 0.0013633   | 0.0005214 | 0.014278                          | No                           |
| pireno                   | 0.5            | 0.000326    | 0.000317 | 0.00062     | 0.00127   | 0.000939    | 0.002962   | 0.0010283   | 0.0004016 | 0.011027                          | No                           |
| COV                      |                |             |          |             |           |             |            |             |           |                                   |                              |
| benceno                  | 170            | 0.047212    | 0.039466 | 0.07818     | 0.15979   | 0.11929     | 0.37559    | 0.128529996 | 0.05064   | 1.39649999                        | No                           |
| tolueno                  | 37,000         | 0.068751    | 0.057596 | 0.11354     | 0.23203   | 0.17327     | 0.54558    | 0.187199995 | 0.073579  | 2.02850008                        | No                           |
| etilbenceno              | 2,000          | 0.008095    | 0.006763 | 0.013401    | 0.027399  | 0.020462    | 0.064426   | 0.022047    | 0.0086863 | 0.23954999                        | No                           |
| xilenos                  | 22,000         | 0.054275    | 0.045214 | 0.090004    | 0.18414   | 0.13757     | 0.43315    | 0.147909999 | 0.058388  | 1.61059999                        | No                           |
| acetaldehído             | 470            | 0.71571     | 0.5944   | 1.1896      | 2.4352    | 1.8198      | 5.7294     | 1.95130002  | 0.77211   | 21.3050003                        | No                           |
| acroleína                | 6.9            | 0.058222    | 0.048361 | 0.096781    | 0.1981    | 0.14802     | 0.46603    | 0.158720002 | 0.062803  | 1.73290002                        | No                           |
| formaldehído             | 55             | 0.38182     | 0.31711  | 0.63466     | 1.2992    | 0.97085     | 3.0566     | 1.04100001  | 0.41192   | 11.3660002                        | No                           |
| propileno                | 8,750          | 0.013355    | 0.011091 | 0.022198    | 0.045441  | 0.033958    | 0.10691    | 0.036412001 | 0.014408  | 0.39754999                        | No                           |

**Tabla 2-3      Análisis de las Concentraciones de 1 Hora en el Aire Para la Evaluación del Caso de Impacto en la Salud Humana y Riesgo Ecológico Para el Proyecto de Cobre de MPSA (continuación)**

| Parámetro      | Umbral de 1 Hr | Río Caimito | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Molejones   | Coclesito | Alrededores del Cerco Perimétrico | ¿Conservar Como QIP de Aire? |
|----------------|----------------|-------------|----------|-------------|-----------|-------------|------------|-------------|-----------|-----------------------------------|------------------------------|
| <b>Metales</b> |                |             |          |             |           |             |            |             |           |                                   |                              |
| aluminio       | 50             | 0.15772     | 0.18305  | 0.43591     | 0.88097   | 1.0333      | 3.6582     | 0.874650002 | 0.46392   | 13.1499996                        | No                           |
| antimonio      | 5              | 0.000265    | 2.97E-05 | 4.5E-05     | 4.37E-05  | 3.96E-05    | 2.36E-05   | 2.853E-05   | 1.925E-05 | 0.00089673                        | No                           |
| arsénico       | 0.2            | 0.006933    | 0.00069  | 0.001025    | 0.000998  | 0.000912    | 0.000576   | 0.00064998  | 0.0004455 | 0.020793                          | No                           |
| bario          | 5              | 0.000503    | 0.000584 | 0.001392    | 0.002814  | 0.003301    | 0.011692   | 0.0027926   | 0.0014817 | 0.04203                           | No                           |
| cadmio         | 0.1            | 0.004794    | 0.000641 | 0.001318    | 0.002629  | 0.002885    | 0.008757   | 0.0028713   | 0.001378  | 0.030638                          | No                           |
| cromo          | 1              | 0.064726    | 0.003102 | 0.004012    | 0.004048  | 0.004753    | 0.016742   | 0.0044065   | 0.0021639 | 0.28828999                        | No                           |
| cromo VI       | 0.1            | 0.001161    | 0.00013  | 0.000198    | 0.000192  | 0.000174    | 0.000103   | 0.00012477  | 8.45E-05  | 0.0039356                         | No                           |
| cobalto        | 0.2            | 0.00147     | 0.000231 | 0.000512    | 0.001017  | 0.001195    | 0.003986   | 0.0010761   | 0.0005489 | 0.014194                          | No                           |
| cobre          | 100            | 62.525      | 2.1387   | 3.4895      | 2.0767    | 3.5759      | 1.5359     | 0.941659987 | 0.76357   | 269.329987                        | Sí                           |
| hierro         | 10             | 0.32672     | 0.37916  | 0.90336     | 1.8259    | 2.1415      | 7.5847     | 1.81219995  | 0.96137   | 27.2660007                        | Sí                           |
| plomo          | 0.5            | 0.045355    | 0.002179 | 0.002821    | 0.002083  | 0.002877    | 0.002926   | 0.001193    | 0.0007247 | 0.20203                           | No                           |
| manganeso      | 2              | 0.007203    | 0.006512 | 0.015479    | 0.031267  | 0.036676    | 0.12967    | 0.031087    | 0.016476  | 0.46603999                        | No                           |
| mercurio       | 0.6            | 0.001297    | 0.000138 | 0.000208    | 0.000202  | 0.000254    | 0.000738   | 0.0001518   | 0.0001172 | 0.0083015                         | No                           |
| molibdeno      | 50             | 0.000179    | 0.000207 | 0.000494    | 0.000999  | 0.001172    | 0.004151   | 0.00099148  | 0.0005261 | 0.014922                          | No                           |
| níquel         | 6              | 0.004161    | 0.000463 | 0.0007      | 0.00068   | 0.000617    | 0.001648   | 0.0004606   | 0.0002999 | 0.013952                          | No                           |
| selenio        | 2              | 0.019473    | 0.00215  | 0.003251    | 0.003155  | 0.002866    | 0.001713   | 0.002055    | 0.0013933 | 0.064912                          | No                           |
| plata          | 0.1            | 0.000381    | 0.00011  | 0.000229    | 0.000459  | 0.000507    | 0.001551   | 0.00049652  | 0.0002403 | 0.0054404                         | No                           |
| estroncio      | 20             | 0.000688    | 0.000798 | 0.001903    | 0.003846  | 0.004511    | 0.015979   | 0.0038165   | 0.0020248 | 0.057446                          | No                           |
| talio          | 1              | 3.91E-07    | 4.54E-07 | 1.08E-06    | 2.19E-06  | 2.56E-06    | 9.08E-06   | 2.1693E-06  | 1.151E-06 | 3.2648E-05                        | No                           |
| titanio        | 50             | 0.005074    | 0.005888 | 0.014032    | 0.028363  | 0.033264    | 0.11783    | 0.028145    | 0.014932  | 0.42359999                        | No                           |
| uranio         | 0.5            | 3.6E-06     | 4.17E-06 | 9.94E-06    | 2.01E-05  | 2.36E-05    | 8.35E-05   | 1.9941E-05  | 1.058E-05 | 0.00030012                        | No                           |
| vanadio        | 30             | 0.18397     | 0.008718 | 0.011263    | 0.008332  | 0.011636    | 0.015766   | 0.005       | 0.0029053 | 0.81946999                        | No                           |
| zinc           | 50             | 0.002669    | 0.001593 | 0.003524    | 0.006998  | 0.008216    | 0.027383   | 0.0074105   | 0.0037769 | 0.097505                          | No                           |

Nota: Los valores sombreados exceden el umbral de 1 hora.

Tabla 2-4      Análisis de las Concentraciones de 24 Horas en el Aire Para la Evaluación del Caso de Impacto en la Salud Humana y Riesgo Ecológico Para el Proyecto de Cobre de MPSA

| Parámetro                   | Umbral de 24 Hrs. | Río Caimito | Palmilla | Nueva Lucha | Parralito | Nuevo Sinai | San Benito | Molejones  | Coclesito   | Alrededores del Cerco Perimétrico | ¿Conservar Como QIP de Aire? |
|-----------------------------|-------------------|-------------|----------|-------------|-----------|-------------|------------|------------|-------------|-----------------------------------|------------------------------|
| <b>Material Particulado</b> |                   |             |          |             |           |             |            |            |             |                                   |                              |
| PM <sub>2.5</sub>           | 25                | 2.4         | 1.3      | 1.6         | 4.9       | 3.4         | 14.2       | 4.6        | 3.1         | 39.3                              | Sí                           |
| PM <sub>10</sub>            | 150               | 119.6       | 74.8     | 99.2        | 77.2      | 117.6       | 79.3       | 60.5       | 224.3       | 258.1                             | Sí                           |
| PTS                         | 360               | 41.7        | 1.0      | 1.1         | 1.5       | 3.7         | 18.7       | 5.2        | 3.4         | 181.4                             | No                           |
| <b>Gases Ácidos</b>         |                   |             |          |             |           |             |            |            |             |                                   |                              |
| monóxido de carbono         | 3,333             | 22.422      | 25.135   | 30.223      | 114.32    | 70.136      | 268.4      | 65.899     | 35.022      | 1198.1                            | No                           |
| dióxido de nitrógeno        | 200               | 10.936564   | 7.34549  | 10.559503   | 38.73334  | 25.752869   | 50.342904  | 29.5336456 | 18.7091198  | 88.47916841                       | No                           |
| dióxido de azufre           | 125               | 7.6709094   | 2.522783 | 2.8789711   | 9.376854  | 5.7800894   | 26.244001  | 6.43658781 | 3.83606458  | 97.7217407                        | No                           |
| <b>HAP</b>                  |                   |             |          |             |           |             |            |            |             |                                   |                              |
| acenafteno                  | 0.1               | 1.57E-05    | 1.59E-05 | 2.008E-05   | 6.65E-05  | 4.081E-05   | 0.0001848  | 4.5748E-05 | 2.74588E-05 | 0.00069434                        | No                           |
| acenaftileno                | 3.5               | 5.496E-05   | 5.77E-05 | 7.289E-05   | 0.000242  | 0.0001481   | 0.0006711  | 0.00016611 | 9.97245E-05 | 0.002521908                       | No                           |
| antraceno                   | 0.2               | 1.001E-05   | 1.03E-05 | 1.3E-05     | 4.31E-05  | 2.642E-05   | 0.0001197  | 2.9625E-05 | 1.77836E-05 | 0.000449697                       | No                           |
| benzo(a)fluoreno            | 0.05              | 2.942E-06   | 3.1E-06  | 3.924E-06   | 1.3E-05   | 7.976E-06   | 3.613E-05  | 8.9424E-06 | 5.369E-06   | 0.000135776                       | No                           |
| benzo(a)pireno              | 0.0011            | 1.336E-06   | 1.36E-06 | 1.718E-06   | 5.69E-06  | 3.491E-06   | 1.581E-05  | 3.9137E-06 | 2.34914E-06 | 5.9402E-05                        | No                           |
| benzo(b,j,k)fluoranteno     | 0.05              | 1.216E-05   | 1.27E-05 | 1.604E-05   | 5.32E-05  | 3.26E-05    | 0.0001477  | 3.6549E-05 | 2.1942E-05  | 0.00055488                        | No                           |
| benzo(e)pireno              | 0.05              | 1.821E-07   | 1.92E-07 | 2.429E-07   | 8.05E-07  | 4.937E-07   | 2.236E-06  | 5.5349E-07 | 3.32314E-07 | 8.40389E-06                       | No                           |
| benzo(g,h,i) perileno       | 1.2               | 2.982E-06   | 3.11E-06 | 3.932E-06   | 1.3E-05   | 7.991E-06   | 3.62E-05   | 8.9596E-06 | 5.3789E-06  | 0.000136022                       | No                           |
| criseno                     | 0.05              | 2.74E-06    | 2.76E-06 | 3.487E-06   | 1.16E-05  | 7.083E-06   | 3.208E-05  | 7.9411E-06 | 4.76624E-06 | 0.000120519                       | No                           |
| dibenzo(a,h)antraceno       | 0.008             | 3.375E-06   | 3.56E-06 | 4.501E-06   | 1.49E-05  | 9.15E-06    | 4.145E-05  | 1.0259E-05 | 6.1592E-06  | 0.00015576                        | No                           |
| dibenzotiofeno              | 2.5               | 1.401E-05   | 2.11E-06 | 2.061E-06   | 2.32E-06  | 7.7E-06     | 4.318E-05  | 5.0488E-06 | 7.22153E-06 | 0.000572773                       | No                           |
| fluoranteno                 | 0.05              | 4.787E-05   | 4.56E-05 | 5.543E-05   | 0.000183  | 0.0001122   | 0.0005152  | 0.00012784 | 7.75713E-05 | 0.001906785                       | No                           |
| fluoreno                    | 1                 | 7.896E-05   | 8.22E-05 | 0.0001038   | 0.000344  | 0.0002109   | 0.0009556  | 0.0002365  | 0.000141979 | 0.003590386                       | No                           |
| indeno (1,2,3) cd pireno    | 0.05              | 2.185E-07   | 1.64E-08 | 1.543E-08   | 2.07E-08  | 2.477E-08   | 1.671E-08  | 1.346E-08  | 1.27974E-08 | 4.07757E-07                       | No                           |
| naftaleno                   | 22.5              | 0.001196    | 0.001247 | 0.0015586   | 0.00516   | 0.0031642   | 0.0143878  | 0.00356361 | 0.002145946 | 0.053831298                       | No                           |
| fenantreno                  | 0.05              | 0.0001231   | 8.77E-05 | 9.863E-05   | 0.000323  | 0.000198    | 0.0009359  | 0.00023353 | 0.00014491  | 0.003349652                       | No                           |
| pireno                      | 0.2               | 6.435E-05   | 6.17E-05 | 7.516E-05   | 0.000248  | 0.0001522   | 0.0006985  | 0.00017332 | 0.000105142 | 0.002586749                       | No                           |
| <b>COV</b>                  |                   |             |          |             |           |             |            |            |             |                                   |                              |
| benceno                     | 7.18              | 0.0107046   | 0.007926 | 0.0095259   | 0.031405  | 0.0192757   | 0.0880061  | 0.02173234 | 0.013085391 | 0.327889472                       | No                           |
| tolueno                     | 943               | 0.0156652   | 0.011469 | 0.0137956   | 0.045554  | 0.0279478   | 0.1281429  | 0.03165207 | 0.019137165 | 0.476283699                       | No                           |
| etilbenceno                 | 14467             | 0.0017959   | 0.001346 | 0.0016292   | 0.00538   | 0.0033013   | 0.0150808  | 0.00372304 | 0.002243669 | 0.056244217                       | No                           |
| xilenos                     | 730               | 0.011502    | 0.008916 | 0.0109198   | 0.036129  | 0.0221648   | 0.1010161  | 0.02491998 | 0.014994399 | 0.378148943                       | No                           |
| acetaldehído                | 500               | 0.145727    | 0.11668  | 0.144246    | 0.477681  | 0.2930654   | 1.3311093  | 0.32815108 | 0.196898401 | 5.00206327                        | No                           |
| acroleína                   | 0.08              | 0.0119281   | 0.009515 | 0.011742    | 0.038867  | 0.0238474   | 0.1082987  | 0.02670055 | 0.016017087 | 0.406867027                       | Sí                           |

Tabla 2-4      **Análisis de las Concentraciones de 24 Horas en el Aire Para la Evaluación del Caso de Impacto en la Salud Humana y Riesgo Ecológico Para el Proyecto de Cobre de MPSA (continuación)**

| Parámetro                   | Umbral de 24 Hrs. | Río Caimito | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Molejones  | Coclesito   | Alrededores del Cerco Perimétrico | ¿Conservar Como QIP de Aire? |
|-----------------------------|-------------------|-------------|----------|-------------|-----------|-------------|------------|------------|-------------|-----------------------------------|------------------------------|
| <b>Material Particulado</b> |                   |             |          |             |           |             |            |            |             |                                   |                              |
| PM <sub>2.5</sub>           | 25                | 2.4         | 1.3      | 1.6         | 4.9       | 3.4         | 14.2       | 4.6        | 3.1         | 39.3                              | Sí                           |
| PM <sub>10</sub>            | 150               | 119.6       | 74.8     | 99.2        | 77.2      | 117.6       | 79.3       | 60.5       | 224.3       | 258.1                             | Sí                           |
| PTS                         | 360               | 41.7        | 1.0      | 1.1         | 1.5       | 3.7         | 18.7       | 5.2        | 3.4         | 181.4                             | No                           |
| formaldehído                | 65                | 0.0777245   | 0.062241 | 0.0769531   | 0.254839  | 0.1563444   | 0.710126   | 0.17506498 | 0.105043776 | 2.66858387                        | No                           |
| propileno                   | 4000              | 0.002716    | 0.002176 | 0.0026913   | 0.008913  | 0.0054682   | 0.0248377  | 0.00612296 | 0.003674115 | 0.093340434                       | No                           |
| <b>Metales</b>              |                   |             |          |             |           |             |            |            |             |                                   |                              |
| aluminio                    | 120               | 0.0364981   | 0.024748 | 0.0621293   | 0.214288  | 0.1883391   | 0.8423348  | 0.1863294  | 0.145512745 | 3.2547369                         | No                           |
| antimonio                   | 25                | 6.156E-05   | 2.61E-06 | 4.137E-06   | 4.62E-06  | 3.846E-06   | 4.851E-06  | 3.925E-06  | 2.57444E-06 | 0.000110388                       | No                           |
| arsénico                    | 0.3               | 0.0014802   | 6.4E-05  | 0.0001027   | 0.000117  | 0.0001059   | 0.0001343  | 0.00010121 | 6.42274E-05 | 0.003826803                       | No                           |
| bario                       | 10                | 0.0001165   | 7.9E-05  | 0.0001983   | 0.000685  | 0.0006016   | 0.0026918  | 0.00059481 | 0.000464791 | 0.010402053                       | No                           |
| cadmio                      | 0.025             | 0.0013012   | 8.87E-05 | 0.0002093   | 0.000613  | 0.000531    | 0.0021428  | 0.00062325 | 0.0004238   | 0.007836855                       | No                           |
| cromo                       | 1.5               | 0.0162556   | 0.000361 | 0.0005076   | 0.000992  | 0.0011857   | 0.0039378  | 0.00093539 | 0.000676516 | 0.080232702                       | No                           |
| cromo VI                    | 0.0001            | 0.0002702   | 1.14E-05 | 1.816E-05   | 2.03E-05  | 1.688E-05   | 2.115E-05  | 1.6444E-05 | 1.12988E-05 | 0.000484479                       | Sí                           |
| cobalto                     | 0.1               | 0.0003444   | 3.16E-05 | 7.727E-05   | 0.00025   | 0.0002183   | 0.000939   | 0.00023353 | 0.000170571 | 0.003555301                       | No                           |
| cobre                       | 50                | 10.937895   | 0.318145 | 0.4162354   | 0.288871  | 0.8335423   | 0.4373132  | 0.30802518 | 0.242953658 | 41.1521759                        | No                           |
| hierro                      | 4                 | 0.0756093   | 0.051258 | 0.1287064   | 0.444105  | 0.3903416   | 1.7462769  | 0.38600445 | 0.301562577 | 6.7481451                         | Sí                           |
| plomo                       | 0.5               | 0.0113885   | 0.000255 | 0.0003717   | 0.000337  | 0.0008574   | 0.0007239  | 0.00043431 | 0.000281248 | 0.056330767                       | No                           |
| manganeso                   | 2.5               | 0.0017349   | 0.000881 | 0.0022092   | 0.007609  | 0.0066856   | 0.0298964  | 0.00663553 | 0.005166878 | 0.115379252                       | No                           |
| mercurio                    | 2                 | 0.0002981   | 1.23E-05 | 1.989E-05   | 2.25E-05  | 3.693E-05   | 0.0002181  | 2.6002E-05 | 3.22835E-05 | 0.002887183                       | No                           |
| molibdeno                   | 120               | 4.137E-05   | 2.8E-05  | 7.042E-05   | 0.000243  | 0.0002136   | 0.0009557  | 0.00021118 | 0.000165018 | 0.003693017                       | No                           |
| níquel                      | 2                 | 0.0009697   | 4.08E-05 | 6.487E-05   | 9.83E-05  | 8.863E-05   | 0.0004559  | 0.0001067  | 8.54304E-05 | 0.002848954                       | No                           |
| selenio                     | 10                | 0.0044765   | 0.000189 | 0.0003022   | 0.000338  | 0.0002812   | 0.0003518  | 0.00027818 | 0.00018817  | 0.008067089                       | No                           |
| plata                       | 1                 | 6.915E-05   | 1.52E-05 | 3.597E-05   | 0.000108  | 9.301E-05   | 0.000373   | 0.00010761 | 7.37458E-05 | 0.001388856                       | No                           |
| estroncio                   | 120               | 0.0001592   | 0.000108 | 0.000271    | 0.000935  | 0.0008222   | 0.0036787  | 0.00081286 | 0.000635151 | 0.014216887                       | No                           |
| talio                       | 0.1               | 9.052E-08   | 6.14E-08 | 1.541E-07   | 5.32E-07  | 4.673E-07   | 2.091E-06  | 4.6206E-07 | 3.61058E-07 | 8.08018E-06                       | No                           |
| titanio                     | 34                | 0.0011742   | 0.000796 | 0.0019989   | 0.006898  | 0.0060632   | 0.0271284  | 0.00599457 | 0.004684085 | 0.104835749                       | No                           |
| uranio                      | 0.05              | 8.32E-07    | 5.64E-07 | 1.416E-06   | 4.89E-06  | 4.296E-06   | 1.922E-05  | 4.2473E-06 | 3.31885E-06 | 7.42759E-05                       | No                           |
| vanadio                     | 1                 | 0.0461313   | 0.001008 | 0.0014294   | 0.001256  | 0.0033351   | 0.0037167  | 0.00164698 | 0.001057116 | 0.227487817                       | No                           |
| zinc                        | 120               | 0.0004841   | 0.000218 | 0.0005322   | 0.00172   | 0.0015016   | 0.0064166  | 0.00159422 | 0.001173323 | 0.024428349                       | No                           |

Nota: Los valores sombreados exceden el umbral de 24 horas.

Tabla 2-5      Cocientes de Riesgo Agudo de 1 Hora Para las Comunidades Regionales

| Parámetro            | Escenario de Desarrollo | Cocientes de Riesgo Para Concentraciones Pico de 1 Hora en Comunidades Regionales |          |             |           |             |            |               |           |                                                  |
|----------------------|-------------------------|-----------------------------------------------------------------------------------|----------|-------------|-----------|-------------|------------|---------------|-----------|--------------------------------------------------|
|                      |                         | Río Caimito                                                                       | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Los Molejones | Coclesito | Alrededores del Cerco Perimétrico <sup>(a)</sup> |
| Gases Ácidos         |                         |                                                                                   |          |             |           |             |            |               |           |                                                  |
| Dióxido de nitrógeno | Impacto                 | 0.2                                                                               | 0.2      | 0.3         | 0.4       | 0.4         | 0.6        | 0.4           | 0.3       | 1.3                                              |
| Metales              |                         |                                                                                   |          |             |           |             |            |               |           |                                                  |
| Cobre                | Impacto                 | 0.6                                                                               | 0.02     | 0.03        | 0.02      | 0.04        | 0.02       | 0.01          | 0.01      | 3                                                |
| Hierro               | Impacto                 | 0.03                                                                              | 0.04     | 0.1         | 0.2       | 0.2         | 0.8        | 0.2           | 0.1       | 3                                                |

<sup>(a)</sup> Los alrededores del cerco perimétrico se consideran como el área alrededor del lindero de la concesión del proyecto donde se realizan las predicciones de aire máximas.

Nota: El texto en negrita y sombreado indica que el valor de CR es mayor a 1.

Tabla 2-6      Cocientes de Riesgo Agudo de 24 Horas Para las Comunidades Regionales

| Parámetro                            | Escenario de Desarrollo | Cocientes de Riesgo Para Concentraciones Pico de 24 Horas en Comunidades Regionales |          |             |           |             |            |               |           |                                                  |
|--------------------------------------|-------------------------|-------------------------------------------------------------------------------------|----------|-------------|-----------|-------------|------------|---------------|-----------|--------------------------------------------------|
|                                      |                         | Río Caimito                                                                         | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Los Molejones | Coclesito | Alrededores del Cerco Perimétrico <sup>(a)</sup> |
| Material Particulado                 |                         |                                                                                     |          |             |           |             |            |               |           |                                                  |
| PM <sub>2,5</sub>                    | Impacto                 | 0.09                                                                                | 0.16     | 0.05        | 0.20      | 0.14        | 0.57       | 0.18          | 0.12      | 1.6                                              |
| PM <sub>10</sub>                     | Impacto                 | 0.8                                                                                 | 0.06     | 0.50        | 0.66      | 0.78        | 0.53       | 0.40          | 1.50      | 1.7                                              |
| Compuestos Orgánicos Volátiles (COV) |                         |                                                                                     |          |             |           |             |            |               |           |                                                  |
| acroleína                            | Impacto                 | 0.1                                                                                 | 0.1      | 0.1         | 0.5       | 0.3         | 1.4        | 0.3           | 0.2       | 5                                                |
| Metales                              |                         |                                                                                     |          |             |           |             |            |               |           |                                                  |
| cromo (VI)                           | Impacto                 | 1.1                                                                                 | 0.0      | 0.1         | 0.1       | 0.1         | 0.1        | 0.1           | 0.0       | 2                                                |
| hierro                               | Impacto                 | 0.02                                                                                | 0.01     | 0.03        | 0.1       | 0.1         | 0.4        | 0.1           | 0.1       | 2                                                |

<sup>(a)</sup> Los alrededores del cerco perimétrico se consideran como el área alrededor del lindero de la concesión del proyecto donde se realizan las predicciones de aire máximas.

Nota: El texto en negrita y sombreado indica que el valor de CR es mayor a 1.

Las Tablas 2-7 y 2-8 presentan la comparación de concentraciones pico, máximas, de percentil 95, de percentil 75 y la cantidad de horas o días en los que las concentraciones previstas son mayores que los límites de exposición aguda, para concentraciones de 1 hora y 24 horas, respectivamente. Los datos de material particulado no eran adecuados para utilizarse en una evaluación cuantitativa debido a las restricciones mencionadas anteriormente, por lo que se utilizó una comparación con el umbral de análisis para realizar una evaluación cualitativa como se describe más a fondo en la evaluación de la magnitud de los efectos.

**Tabla 2-7 Concentraciones de QIP de 1 Hora Previstas Para el Escenario de Impacto Comparadas con los Límites de Exposición Aguda y la Cantidad de Horas por año en las que se Excede el Límite**

| Parámetro            | Lugar                                            | Límite de Exposición Aguda [µg/m <sup>3</sup> ] | Caso de Impacto                                  |                                                    |                                  |                                   |                                                                               |
|----------------------|--------------------------------------------------|-------------------------------------------------|--------------------------------------------------|----------------------------------------------------|----------------------------------|-----------------------------------|-------------------------------------------------------------------------------|
|                      |                                                  |                                                 | Pico de 1 Hr <sup>(a)</sup> [µg/m <sup>3</sup> ] | Máxima de 1 Hr <sup>(a)</sup> [µg/m <sup>3</sup> ] | Percentil 9 [µg/m <sup>3</sup> ] | Percentil 75 [µg/m <sup>3</sup> ] | Cantidad de Horas en el Año en que la Concentración Pico > LEA <sup>(e)</sup> |
| dióxido de nitrógeno | alrededores del cerco perimétrico <sup>(d)</sup> | 200                                             | 266.7                                            | 242.3                                              | 106.8                            | 72.8                              | 45                                                                            |
| cobre                | alrededores del cerco perimétrico <sup>(d)</sup> | 100                                             | 269.3                                            | 127.5                                              | 42.2                             | 6.8                               | 13                                                                            |
| hierro               | alrededores del cerco perimétrico <sup>(d)</sup> | 10                                              | 27.3                                             | 22.8                                               | 8.6                              | 3.4                               | 337                                                                           |

<sup>(a)</sup> La concentración pico es la primera concentración más alta prevista por el modelo de calidad de aire para un período de exposición de 1 hora.

<sup>(b)</sup> La concentración máxima es la novena concentración más alta prevista por el modelo de calidad de aire para un período de exposición de 1 hora. Esta es la estadística que usualmente se compara con las Directrices de Calidad del Aire Ambiental. No incluye los pronósticos considerados como valores atípicos del modelo (debido a condiciones meteorológicas extremas, raras o transitorias).

<sup>(c)</sup> La cantidad máxima de horas en un año en las que las concentraciones pico previstas son mayores que la guía aplicable.

<sup>(d)</sup> Los alrededores del cerco perimétrico se consideran como el área alrededor del lindero de la concesión del proyecto donde se espera que ocurran las concentraciones máximas de químicos en el aire.

<sup>(e)</sup> LEA – Límite de Exposición Aguda.

**Tabla 2-8 Concentraciones de QIP de 24 Horas Previstas Para el Escenario de Impacto Comparadas con los Límites de Exposición Aguda y la Cantidad de Horas por año en las que se Excede el Límite**

| Parámetro         | Lugar                                            | Límite de Exposición Aguda [µg/m <sup>3</sup> ] | Caso de Impacto                                   |                                   |                                   |                                                                               |
|-------------------|--------------------------------------------------|-------------------------------------------------|---------------------------------------------------|-----------------------------------|-----------------------------------|-------------------------------------------------------------------------------|
|                   |                                                  |                                                 | Pico de 24 Hr <sup>(a)</sup> [µg/m <sup>3</sup> ] | Percentil 95 [µg/m <sup>3</sup> ] | Percentil 75 [µg/m <sup>3</sup> ] | Cantidad de Horas en el Año en que la Concentración Pico > LEA <sup>(c)</sup> |
| PM <sub>2.5</sub> | alrededores del cerco perimétrico                | 25                                              | 39.3                                              | 23.2                              | 13.4                              | 13                                                                            |
| PM <sub>10</sub>  | alrededores del cerco perimétrico                | 150                                             | 258.1                                             | 135.3                             | 78.5                              | 2                                                                             |
| Acroleína         | San Benito                                       | 0.08                                            | 0.11                                              | 0.06                              | 0.03                              | 3                                                                             |
|                   | alrededores del cerco perimétrico <sup>(c)</sup> | 0.08                                            | 0.41                                              | 0.24                              | 0.12                              | 197                                                                           |
| Cromo (VI)        | Río Caimito                                      | 0.00025                                         | 0.0003                                            | 0.00005                           | 0                                 | 1                                                                             |
|                   | alrededores del cerco perimétrico <sup>(c)</sup> | 0.00025                                         | 0.0005                                            | 0.0003                            | 0.0002                            | 59                                                                            |
| Hierro            | alrededores del cerco perimétrico <sup>(c)</sup> | 4                                               | 6.7                                               | 4.5                               | 2.9                               | 34                                                                            |

- (a) La concentración pico es la primera concentración más alta prevista por el modelo de calidad de aire para un período de exposición de 24 horas.
- (b) La cantidad máxima de días en un año en los que las concentraciones pico de 24 horas previstas son mayores que la guía aplicable.
- (c) Los alrededores del cerco perimétrico se consideran como el área alrededor del lindero de la concesión del proyecto donde se espera que ocurran las concentraciones máximas de químicos en el aire.
- (d) LEA – Límite de Exposición Aguda

Los resultados de las evaluaciones de la magnitud de los efectos se presentan en las Tablas 2-9 a 2-14. La magnitud del efecto para los compuestos evaluados fue insignificante o baja en todos los casos.



**Tabla 2-9      Análisis Complementario del Dióxido de Nitrógeno (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| <b>Criterios de Análisis</b>                                        | <b>Comentarios</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites agudos | Las concentraciones de los percentiles 95 y 75 previstas no exceden el límite de exposición aguda. Se espera que la concentración de dióxido de nitrógeno pico de 1 hora sea mayor que el umbral agudo para 45 horas por año sólo en los alrededores del cerco perimétrico. El CR para dióxido de nitrógeno en los alrededores del cerco perimétrico es 1.3.                                                                                                                                                                                                                                                                                                                                        |
| conservadurismo en los límites agudos para dióxido de nitrógeno     | Se utilizó el umbral de la OMS ( $200 \mu\text{g}/\text{m}^3$ ) en esta evaluación (OMS 2005). Se han reportado efectos en la salud de humanos luego de 1 hora de exposición a concentraciones de dióxido de nitrógeno mayores que $500 \mu\text{g}/\text{m}^3$ . El menor nivel de exposición a dióxido de nitrógeno que ha dado lugar a un efecto directo en la función pulmonar de asmáticos en más de un estudio de laboratorio fue $560 \mu\text{g}/\text{m}^3$ . Sin embargo, se ha reportado una mayor respuesta bronquial en asmáticos en niveles superiores a $200 \mu\text{g}/\text{m}^3$ , y este valor ha sido conservado como el límite de exposición a corto plazo por la OMS (2005). |
| efectos potenciales del dióxido de nitrógeno en la salud            | Se ha reportado respuesta bronquial en asmáticos en concentraciones mayores que $200 \mu\text{g}/\text{m}^3$ (OMS 2005). Las concentraciones pico de una hora exceden el umbral agudo de la OMS sólo en los alrededores del cerco perimétrico.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| magnitud del efecto                                                 | La concentración pico de 1 hora prevista para dióxido de nitrógeno excede los criterios de calidad de aire elegidos (estándar de aire de la OMS) pero las concentraciones previstas de los percentiles 95 y 75 son mucho menores que aquéllas en las que se observaron efectos en la salud. Además, el CR es sólo ligeramente mayor a 1. De acuerdo con esta información, la magnitud del efecto para dióxido de nitrógeno se considera baja.                                                                                                                                                                                                                                                       |

Notas:  $\mu\text{g}/\text{m}^3$  = Microgramos por metro cúbico; OMS = Organización Mundial de la Salud;  
 CR = Cociente de Riesgo.

**Tabla 2-10 Análisis Complementario del Cobre (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| <b>Criterios de Análisis</b>                                        | <b>Comentarios</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites agudos | Las concentraciones de los percentiles 95 y 75 no exceden el límite de exposición aguda. De acuerdo con un período de exposición de 1 hora, se prevé que sólo las concentraciones pico de cobre en los alrededores del cerco perimétrico exceden el límite de exposición aguda para 13 horas al año. El CR para cobre en los alrededores del cerco perimétrico es 3.                                                                                                                                                            |
| conservadurismo en los límites agudos para cobre                    | Se utilizó un umbral de 1 hora de la OEHHA (OEHHA 2008). El umbral de la OEHHA se basa en el NOAEL para fiebre de los vapores metálicos en los trabajadores. Se aplicó un factor de incertidumbre de 10 al NOAEL para individuos sensibles.                                                                                                                                                                                                                                                                                     |
| efectos potenciales del cobre en la salud                           | La exposición ocupacional aguda al polvo de cobre ha dado lugar a efectos en la salud que incluyen sabor metálico o dulce en la boca, irritación de las vías respiratorias superiores y náuseas. Trabajadores de una fábrica expuestos a vapores de cobre durante 1 a 10 horas mostraron síntomas de irritación de las vías respiratorias superiores, fiebre de los vapores metálicos (fiebre, disnea, escalofríos, dolor de cabeza, náuseas, mialgia, tos, falta de aliento, sabor dulce y metálico y vómitos (OEHHA 2008).    |
| magnitud del efecto                                                 | La concentración pico de 1 hora de exposición prevista para cobre excede el umbral agudo, pero las concentraciones previstas de los percentiles 95 y 75 son más bajas que aquéllas en las que se observaron efectos en la salud. El CR para cobre en los alrededores del cerco perimétrico es 3, lo cual se considera representativo de riesgo bajo. De acuerdo con esta información, la magnitud del efecto para cobre se considera baja en los alrededores del cerco perimétrico e insignificante en todos los demás lugares. |

Notas: NOAEL = no observed adverse effect level (nivel de efectos adversos no observados); OEHHA = office of Environmental Health Hazard Assessment (oficina de Evaluación de Peligros Ambientales para la Salud); CR = cociente de riesgo.

**Tabla 2-11 Análisis Complementario del Hierro (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| Criterios de Análisis                                               | Comentarios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites agudos | <ul style="list-style-type: none"> <li>- De acuerdo con un período de exposición de 1 hora, las concentraciones de los percentiles 95 y 75 no exceden el límite de exposición aguda, sin embargo, se prevé que las concentraciones pico de hierro en los alrededores del cerco perimétrico excederán el umbral agudo para 337 horas al año. El CR para hierro (exposición de 1 hora) en los alrededores del cerco perimétrico es 3.</li> <li>- De acuerdo con un período de exposición de 24 horas, la concentración del percentil 95 excede el límite de exposición aguda y se prevé que las concentraciones pico de hierro en los alrededores del cerco perimétrico excederán el límite de exposición aguda para 34 días al año. El CR para hierro (exposición de 24 horas) en los alrededores del cerco perimétrico es 2.</li> </ul>                                                                                                                              |
| conservadurismo en los límites agudos para hierro                   | <ul style="list-style-type: none"> <li>- El umbral de hierro (sales solubles) de la TCEQ (<math>10 \mu\text{g}/\text{m}^3</math>) se basa en un punto final de salud para 1 hora de exposición, sin embargo, no se cuenta con documentación de respaldo.</li> <li>- El umbral de 24 horas de exposición del OMEE (<math>4 \mu\text{g}/\text{m}^3</math>) para hierro metálico se basa en un punto final de contaminación, no se cuenta con un umbral agudo basado en un punto final de salud.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| efectos potenciales del hierro en la salud                          | <ul style="list-style-type: none"> <li>- Los efectos en la salud debido a la exposición aguda al óxido de hierro incluyen irritación aguda de las vías respiratorias superiores e intoxicación aguda por hierro. Los síntomas de la intoxicación aguda por hierro son shock bifásico, aumento rápido de la frecuencia respiratoria y cardíaca, así como congestión de los vasos sanguíneos.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| magnitud del efecto                                                 | <ul style="list-style-type: none"> <li>- La concentración pico de 1 hora de exposición prevista para hierro excede el umbral agudo, pero las concentraciones previstas de los percentiles 95 y 75 son menores que aquéllas en las que se observaron efectos en la salud. El CR para hierro en los alrededores del cerco perimétrico es 3, lo que se considera que representa un riesgo bajo. De acuerdo con esta información, la magnitud del efecto del hierro (exposición de 1 hora) se considera baja.</li> <li>- Las concentración pico de 24 horas previsto y la del percentil 95 exceden el umbral agudo; sin embargo la concentración del percentil 75 es más baja que el umbral. El CR para el umbral de 24 horas es 2. Sin embargo, el umbral de 24 horas no se basa en efectos sobre la salud, salvo por el de la contaminación. De acuerdo con esta información, la magnitud del efecto del hierro (exposición de 24 horas) se considera baja.</li> </ul> |

Notas:  $\mu\text{g}/\text{m}^3$  – microgramos por metro cúbico; CR = cociente de riesgo.

**Tabla 2-12 Análisis Complementario de las Acroleínas (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| Criterios de Análisis                                               | Comentarios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites agudos | Las concentraciones de 24 horas de los percentiles 95 y 75 exceden los límites agudos en los alrededores del cerco perimétrico. Las concentraciones de los percentiles 95 y 75 no exceden los límites agudos en San Benito. De acuerdo con un período de exposición de 24 horas, se espera que las concentraciones pico de acroleína excedan el límite de exposición aguda para 197 días al año en los alrededores del cerco perimétrico y para 3 días al año en San Benito. Los CR son de 5 en los alrededores del cerco perimétrico y de 1.4 en San Benito.                                                                                              |
| conservadurismo en los límites agudos para acroleínas               | El límite agudo de 24 horas elegido para acroleínas ( $0.08 \mu\text{g}/\text{m}^3$ ) es del Ministerio de Medio Ambiente de Ontario (OMEE 2008). El límite agudo se basa en un efecto sobre la salud, sin embargo no se provee información alguna sobre la forma en que se infirió de este valor.                                                                                                                                                                                                                                                                                                                                                         |
| efectos potenciales de las acroleínas en la salud                   | La irritación ocular es el punto final más común en humanos luego de la exposición aguda a acroleína (OMEE 2005). La concentración más baja en la que se reportó irritación ocular fue de $137 \mu\text{g}/\text{m}^3$ por 5 minutos (Darley et al. 1960). La irritación de la nariz y garganta, así como otros efectos respiratorios por lo general ocurren a mayores concentraciones que la irritación ocular ( $>340 \mu\text{g}/\text{m}^3$ ). Todas las concentraciones previstas son mucho más bajas que las que mostraron ocasionar efectos en estos estudios. Los efectos potenciales en la salud como resultado del proyecto son insignificantes. |
| magnitud del efecto                                                 | La concentración pico de 24 horas prevista para acroleína excede los criterios de calidad de aire elegidos (directriz basada en la salud del OMEE) pero las concentraciones previstas de los percentiles 95 y 75 son más bajas que aquéllas en las que se observaron efectos en la salud. Los CR son 1.4 y 5 para acroleína en San Benito y los alrededores del cerco perimétrico, respectivamente, los cuales se considera que representan un riesgo bajo. Según esta información, la magnitud del efecto para la acroleína se considera baja.                                                                                                            |

Notas:  $\mu\text{g}/\text{m}^3$  = microgramos por metro cúbico; CR = cociente de riesgo.

**Tabla 2-13      Análisis Complementario del Cromo (VI) (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| <b>Criterios de Análisis</b>                                        | <b>Comentarios</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites agudos | Las concentraciones de 24 horas de los percentiles 95 y 75 exceden los límites de exposición aguda en los alrededores del cerco perimétrico. Sin embargo, la concentración de los percentiles 95 y 75 no excede el límite de exposición aguda en Río Caimito. De acuerdo con un período de exposición de 24 horas, se espera que las concentraciones pico de cromo (VI) excedan el límite de exposición aguda para 59 días al año en los alrededores del cerco perimétrico y para 1 día al año en Río Caimito. El CR en los alrededores del cerco perimétrico es de 2 y de 1.1 en Río Caimito. |
| conservadurismo en los límites agudos para cromo (VI)               | No se cuenta con un umbral de 24 horas. Por lo tanto, se utilizó un umbral anual de la OMS ( $0.00025 \mu\text{g}/\text{m}^3$ ). Este es un supuesto sumamente conservador debido a la falta de un umbral de 24 horas. El umbral de la OMS se basa en estudios a trabajadores expuestos al cromo (VI). Se tomó una media geométrica de $4 \times 10^{-2}$ de los diferentes estudios sobre el cáncer al pulmón en humanos como un riesgo unitario creciente.                                                                                                                                   |
| efectos potenciales del cromo (VI) en la salud                      | El principal órgano afectado por el cromo (VI) es el tracto respiratorio (es decir, los bronquios), lo que puede traer como resultado cáncer al pulmón (OMS 2000).                                                                                                                                                                                                                                                                                                                                                                                                                             |
| magnitud del efecto                                                 | El umbral utilizado en esta evaluación es para exposición anual y se empleó de manera conservadora para evaluar riesgos de exposición de 24 horas. Utilizando este valor umbral conservador, se determinaron CR de 1.1 y 2 para Río Caimito y los alrededores del cerco perimétrico, respectivamente, lo cual se considera que representa un riesgo bajo.                                                                                                                                                                                                                                      |

Notas:  $\mu\text{g}/\text{m}^3$  = microgramos por metro cúbico; CR = cociente de riesgo; OMS = Organización Mundial de la Salud.

**Tabla 2-14      Análisis Complementario de Material Particulado (Efectos Agudos) y Determinación de la Magnitud del Efecto**

| Criterios de Análisis                                                            | Comentarios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites de exposición aguda | <ul style="list-style-type: none"> <li>- No se prevé que las concentraciones de los percentiles 95 y 75 excedan el límite de exposición aguda para PM<sub>2.5</sub> o PM<sub>10</sub>.</li> <li>- Se espera que las concentraciones pico de 24 horas de PM<sub>2.5</sub> y PM<sub>10</sub> sean mayores que el umbral agudo para 13 días y 1 día al año, respectivamente sólo en los alrededores del cerco perimétrico.</li> <li>- El CR para PM<sub>2.5</sub> y PM<sub>10</sub> en los alrededores del cerco perimétrico es de 2 y 1.2 respectivamente.</li> </ul>                                                                                                                                                                                                                                                                              |
| conservadurismo en los límites de exposición aguda para material particulado     | <ul style="list-style-type: none"> <li>- El umbral de PM<sub>2.5</sub> (25 µg/m<sup>3</sup>) utilizado en esta evaluación de riesgo es de la OMS (2005) que se derivó de la relación con niveles anuales de PM.</li> <li>- El umbral anual de PM<sub>2.5</sub> de la OMS se basa en los niveles más bajos en los que se ha demostrado un aumento de la mortalidad total, cardiopulmonar y de cáncer al pulmón con más de 95% de certeza en respuesta a una exposición a material particulado a largo plazo.</li> <li>- El umbral de PM<sub>10</sub> utilizado es de la Autoridad Nacional de Aire Ambiental de Panamá (2006).</li> </ul>                                                                                                                                                                                                         |
| efectos agudos potenciales del material particulado en la salud                  | <ul style="list-style-type: none"> <li>- Los efectos en la salud relacionados con la exposición a corto plazo a PM son principalmente efectos respiratorios y cardiovasculares (OMS 2005) y pueden asociarse a cualquier incremento de la concentración de PM sobre el fondo.</li> <li>- Las relaciones epidemiológicas pueden utilizarse para calcular el aumento de incidencias diarias de mortalidad y morbilidad con respecto a los cambios previstos de las condiciones de fondo.</li> <li>- Sin embargo, de acuerdo con una búsqueda de material bibliográfico, aún no se han desarrollado relaciones epidemiológicas para países centroamericanos y la extrapolación de un contexto norte/sudamericano de centros urbanos con un alto porcentaje de fuentes relacionadas con combustión no es adecuada para la selva panameña.</li> </ul> |
| magnitud del efecto                                                              | <ul style="list-style-type: none"> <li>- La concentración pico de 24 horas prevista para material particulado (PM<sub>2.5</sub> y PM<sub>10</sub>) excede los criterios de calidad de aire elegidos en los alrededores del cerco perimétrico, pero las concentraciones previstas de los percentiles 95 y 75 son mucho menores que aquéllas en las que se observaron efectos en la salud.</li> <li>- Los datos de monitoreo de la calidad del aire del campamento Colina estuvieron fuertemente influenciados por actividades previas al Proyecto, tales como la construcción de caminos, por lo tanto, las mediciones no se consideraron representativas de las condiciones de línea base y se utilizó una ordenación escalar de los datos de PM<sub>10</sub> en Río Caimito.</li> </ul>                                                         |

**Tabla 2-14      Análisis Complementario de Material Particulado (Efectos Agudos) y Determinación de la Magnitud del Efecto (continuación)**

| Criterios de Análisis | Comentarios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <ul style="list-style-type: none"> <li>- No se midieron los datos de PM<sub>2.5</sub> en el caso de línea base.</li> <li>- Debido a las restricciones antes mencionadas, los datos de PM no son adecuados para utilizarse en una evaluación cuantitativa de la relación epidemiológica para determinar un aumento en las incidencias de mortalidad y morbilidad.</li> <li>- Los CR son sólo ligeramente mayores que 1 y de acuerdo con esta información, la magnitud del efecto para material particulado se considera baja y la incertidumbre subyacente será tratada con monitoreo adicional.</li> </ul> |

Notas:  $\mu\text{g}/\text{m}^3$  = Microgramos por metro cúbico; PM = Material particulado; OMS = Organización Mundial de la Salud.

### **3 MÉTODOS Y RESULTADOS DE LA EVALUACIÓN DE RIESGOS DE LA CALIDAD DEL AIRE PARA LA SALUD HUMANA A LARGO PLAZO**

Se realizaron evaluaciones de los riesgos asociados con la exposición a largo plazo/crónica (anual) para la línea base y los casos de impacto. Los métodos, resultados y comparaciones se presentan a continuación.

#### **3.1 UMBRALES DE AIRE CRÓNICOS E IDENTIFICACIÓN DE QUÍMICOS DE INTERÉS POTENCIAL CRÓNICOS**

Las concentraciones promedio anuales en el aire previstas del caso de Impacto de todos los lugares receptores se compararon con las Concentraciones de Aire basadas en Riesgos (CBR) para la protección de la salud humana. Las CBR se obtuvieron de la U.S. EPA (Agencia de Protección Ambiental de los Estados Unidos) (U.S. EPA 2010b, sitio de Internet), Texas Commission on Environmental Quality (Comisión de Calidad Ambiental de Texas) (TCEQ 2009, sitio de Internet), California Office of Environmental Health Hazard Assessment (Oficina de Evaluación de Peligros Ambientales para la Salud de California) (OEHHA 2008, sitio de Internet) y la Organización Mundial de la Salud (OMS 2000, 2005). Las concentraciones basadas en riesgos utilizan “niveles seguros” de toxicidad o límites de exposición combinados con variables de exposición “estándar” (por ejemplo, pesos corporales, frecuencias de inhalación, ingesta y exposición) para calcular las concentraciones químicas que corresponden a niveles fijos de riesgo.

Se utilizó la siguiente jerarquía para elegir las CBR empleadas en la evaluación de riesgos: 1) OMS, 2) US EPA 3) OEHHA, y 4) TCEQ. Se utilizaron CBR basadas en el olor debido a la falta de una CBR basada en la salud. La Tabla 3-1 muestra un resumen de las CBR seleccionadas que se utilizaron en esta evaluación. En la Tabla 3-2 se muestra el análisis de las concentraciones crónicas en el aire. Si las concentraciones de químicos previstas fueron mayores que las CBR y además mostraron un cambio mayor al 10% con respecto a las concentraciones de fondo previstas, se definieron como Químicos de Interés Potencial (QIP). Se consideró que una comparación con concentraciones 10% por encima de la línea base representaba una evaluación conservadora de si era probable que ocurriera un impacto medible relacionado con el proyecto en la calidad ambiental. Debido a la variabilidad temporal, variabilidad en el muestreo y métodos de laboratorio y la incertidumbre inherente a los modelos predictivos de la calidad de aire, se consideró que era poco probable que cualquier aumento previsto menor a 10% por encima de la línea base reflejara un cambio real en la calidad del aire relacionado con el proyecto. Los contaminantes de interés potencial identificados para el análisis complementario en la evaluación de



riesgos crónicos de inhalación de aire incluyen material particulado, aluminio, cobre y hierro. El aluminio, cobre y hierro se trataron en la evaluación con múltiples medios ya que se encuentran presentes en otros medios (por ejemplo, suelo, agua, sedimentos y alimentos) además del aire. Se conservó el material particulado para una futura evaluación.

### 3.1.1 Evaluación de Toxicidad

La evaluación de toxicidad tiene que ver con la identificación de los efectos potencialmente tóxicos de los químicos y determinar la cantidad de químicos a los que puede estar expuesto un receptor sin experimentar efectos inaceptables (es decir, Valores de Referencia de Toxicidad [VRT]). Los VRT se basan simplemente en efectos críticos observados en estudios a poblaciones humanas o especies animales expuestas.

Los Valores de Referencia de Toxicidad para químicos no cancerígenos se denominan Concentraciones de Referencia (CRf) y los VRT para químicos cancerígenos se denominan Riesgos Unitarios (RU), sin embargo, ninguno de los QIP de aire crónicos identificados en esta evaluación de riesgos es cancerígeno. Una CRf es un estimado de exposición a inhalación continua de un químico por la población humana (incluyendo subgrupos sensibles) que probablemente carezca de un riesgo apreciable de efectos nocivos durante toda una vida. Se recopilaron las CRf disponibles de las siguientes entidades:

- Organización Mundial de la Salud (OMS 2000);
- Niveles de Análisis Regionales de la Agencia de Protección Ambiental de los Estados Unidos (U.S. EPA 2010, sitio de Internet);
- Agencia para el Registro de Sustancias Tóxicas y Enfermedades (ASTDR 2010, sitio de Internet);
- Instituto Nacional de Salud Pública y Medio Ambiente (RIVM 2001); y
- Health Canada (Health Canada 2009).

Se eligieron las concentraciones de referencia de acuerdo con la siguiente jerarquía: 1) OMS, 2) US EPA 3) ATSDR, 4) RIVM, y 5) Health Canada. La Tabla 3-3 muestra las CRf disponibles, elegidas y la base toxicológica de las CRf. Éstas fueron recopiladas sólo para los QIP identificados en la Sección 1.2.1

Tabla 3-1      Umbrales de Inhalación Crónica Basados en la Salud (Concentraciones Basadas en Riesgos)

| Parámetro            | USEPA <sup>(a)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | OMS <sup>(d)</sup><br>[µg/m³] | Panamá <sup>(e)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------|---------------------------------|--------------------------------|---------------------------------|-------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Material Particulado |                                 |                                |                                 |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| PM <sub>2.5</sub>    | n/d                             | n/d                            | n/d                             | 10                            | n/d                              | El umbral de la OMS se basa en los niveles más bajos en los que se ha demostrado un aumento de la mortalidad total, cardiopulmonar y de cáncer al pulmón con más de 95% de certeza en respuesta a una exposición a material particulado a largo plazo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PM <sub>10</sub>     | n/d                             | n/d                            | n/d                             | 20                            | 50                               | El umbral de la OMS se basa en los niveles más bajos en los que se ha demostrado un aumento de la mortalidad total, cardiopulmonar y de cáncer al pulmón con más de 95% de certeza en respuesta a una exposición a material particulado a largo plazo. No se cuenta con documentación de respaldo disponible para el estándar de aire de Panamá.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Metales              |                                 |                                |                                 |                               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| aluminio             | 1.04                            | 5                              | n/d                             | n/d                           | n/d                              | El umbral de los niveles de análisis regionales de la USEPA se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| antimonio            | n/d                             | 0.5                            | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| arsénico             | 0.0057                          | 0.01                           | 0.015                           | 0.0066                        | n/d                              | El nivel de análisis regional de la USEPA se basa en un nivel de exposición de referencia oral que causó una disminución de la función intelectual en niños de 10 años. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA es para un período de exposición de 9.5 a 10.5 años en base a un LOAEL para disminución de la función intelectual, efectos adversos en el desarrollo neuroconductual en niños. Se aplicó un factor de incertidumbre de 30 al LOAEL; 3 por calcular el LOAEL por análisis cuantitativo de datos de estudios y 10 por variación intraespecies. El umbral de la OMS se basa en poblaciones humanas expuestas en Suecia y los Estados Unidos y su susceptibilidad al cáncer de pulmón.                                                                                                                                                                                                                                                                                                                                                            |
| bario                | 0.104                           | 0.5                            | n/d                             | n/d                           | n/d                              | El nivel de análisis regional de la USEPA se basa en una CRf derivada de un estudio de fetotoxicidad en ratas de 4 meses de edad. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| cadmio               | 0.014                           | 0.01                           | 0.02                            | 0.003                         | n/d                              | El nivel de análisis regional de la USEPA se basó en una CRf derivada de estudios en humanos que mostraron efectos renales. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un estudio en humanos expuestos de manera ocupacional, durante un período de exposición promedio de 4.1 años para el grupo. Los efectos críticos medidos fueron enfermedades renales y respiratorias. El umbral de la OMS se basa en una evaluación general de datos de trabajadores industriales expuestos al cadmio. El umbral se estableció en un nivel de exposición de 3 µg/m³ para 8 horas, para prevenir la disfunción tubular renal.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| cromo (total)        | n/d                             | 0.1                            | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ para metal de cromo se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| cromo VI             | 0.0001                          | 0.01                           | 0.2                             | 0.00025                       | n/d                              | El umbral del nivel de análisis regional de la USEPA se basa en un estudio en ratas que mostró efectos en el sistema respiratorio (lactato deshidrogenasa en el fluido de lavado bronquioalveolar). Se utilizó una concentración de punto de referencia del estudio en ratas, proporción de dosis depositada regional y factores de incertidumbre (300) para derivar una CRf de 1E-4 mg/m³. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un período de exposición de 90 días basado en un BMC <sub>05</sub> de 12.5 µg/m³ para hiperplasia broncoalveolar en ratas Wister macho. Se calculó una concentración equivalente para humanos de acuerdo con este valor. Luego, se aplicó un factor de 100 a este valor; 3 por incertidumbre subcrónica, 3 por variación interespecies y 10 por variación intraespecies. El umbral de la OMS se basa en estudios a trabajadores expuestos al cromo VI. Se tomó una media geométrica de 4 x 10 <sup>-2</sup> de los diferentes estudios sobre el cáncer de pulmón en humanos como un riesgo unitario creciente. |

Tabla 3-1      Umbrales de Inhalación Crónica Basados en la Salud (Concentraciones Basadas en Riesgos) (continuación)

| Parámetro | USEPA <sup>(a)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | OMS <sup>(d)</sup><br>[µg/m³] | Panamá <sup>(e)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------|---------------------------------|--------------------------------|---------------------------------|-------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cobalto   | 0.0027                          | 0.02                           | n/d                             | n/d                           | n/d                              | El umbral de los niveles de análisis regionales de la USEPA se basa en un NOAEL (1.9 µg/m3) para disminución de la función pulmonar e irritación de las vías respiratorias en trabajadores. El NOAEL se ajustó utilizando un factor de incertidumbre de 300: 3 por la extrapolación de exposición subcrónica a crónica, 10 por insuficiencias de la base de datos y 10 por variabilidad humana entre individuos. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| cobre     | n/d                             | 1 <sup>(f)</sup>               | 100                             | n/d                           | n/d                              | El umbral de la TCEQ es para polvo y niebla de cobre y se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un estudio donde los trabajadores expuestos experimentaron la fiebre de los vapores metálicos. De acuerdo a este estudio, se estableció un valor límite umbral (NOAEL) de 1 mg/m³ para polvo de cobre. Luego, se aplicó un factor de incertidumbre de 10 a este valor por la variabilidad en la respuesta individual.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| hierro    | n/d                             | 1                              | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ es para hierro (sales solubles) y se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| plomo     | n/d                             | n/d                            | n/d                             | 0.5                           | n/d                              | El umbral de la OMS se basa en asegurar que por lo menos 98% de una población expuesta tiene niveles sanguíneos que no exceden los 100 µg/L. En consecuencia, el nivel de plomo anual promedio en el aire no debería exceder los 0.5 µg/m³. Este umbral se basa en la suposición de que el límite superior de sangre no antropogénica es de 30 µg/L.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| manganeso | 0.0104                          | 0.2                            | 0.09                            | 0.15                          | n/d                              | El nivel de análisis regional de la USEPA se pasa en un estudio ocupacional del deterioro de la función neuroconductual luego de la exposición a óxidos y sales de manganeso. Un efecto crítico de este estudio fue el deterioro de la función neuroconductual. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un estudio del deterioro de la función neuroconductual en humanos expuestos al manganeso 8 horas al día en el lugar de trabajo. La concentración de exposición ajustada para el tiempo fue de 26 µg/m³. Se utilizó un factor de incertidumbre acumulativo de 300: √ 10 por la conversión de subcrónico a crónico, 10 por la mayor absorción y depósito pulmonar en niños y 10 por la mayor susceptibilidad de los niños a la neurotoxicidad. El umbral de la OMS se basa en efectos neurotóxicos observados en trabajadores expuestos de manera ocupacional utilizando un NOAEL estimado de 0 µg/m³. El NOAEL se ajustó dividiéndolo por un factor de 4.2 para adaptarlo a exposición continua, y por un factor de incertidumbre de 50: 10 por la variación interindividual y 5 por los efectos en el desarrollo de niños más pequeños. |
| mercurio  | 0.062                           | 0.025                          | 0.03                            | 1                             | n/d                              | El umbral del nivel de análisis regional de la USEPA se basa en un estudio ocupacional en humanos. Los efectos críticos incluyen temblor de manos y un aumento de la alteración de la memoria. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en el deterioro de la función neuroconductual en humanos expuestos al mercurio 8 horas al día 5 días a la semana en el lugar de trabajo. Se aplicó un factor de incertidumbre de 300 al LOAEL de la OEHHA (un factor de 10 como defecto por un efecto severo y falta de NOAEL, y un factor de 30 por variación intraespecies). El umbral de la OMS se basa en el LOAEL para inhalación de vapor de metil mercurio. Se aplicó un factor de 20 (10 por incertidumbre debido a sensibilidades variables en poblaciones de alto riesgo y un factor de 2 por la extrapolación de un LOAEL a un NOAEL).                                                                                                                                                                                                                                                                                                           |
| molibdeno | n/d                             | 5                              | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| níquel    | 0.094                           | 0.015                          | 0.05                            | 0.025                         | n/d                              | El nivel de análisis regional de la USEPA se basa en un NOAEL para inflamación crónica activa y fibrosis pulmonar en ratas. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un LOAEL para patología pulmonar, nasal epitelial y linfática en ratas hembra y macho. El LOAEL se convirtió a una concentración equivalente para humanos de 1.6 µg/m³. Se aplicó un factor de 30 por incertidumbre del LOAEL (3 por variabilidad interespecies y 10 por variabilidad intraespecies). El umbral de la OMS se basó en estimados de exposición y riesgo en poblaciones industriales para casos reportados de cáncer al pulmón.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Tabla 3-1      Umbrales de Inhalación Crónica Basados en la Salud (Concentraciones Basadas en Riesgos) (continuación)

| Parámetro | USEPA <sup>(a)</sup><br>[µg/m³] | TCEQ <sup>(d)</sup><br>[µg/m³] | OEHHA <sup>(c)</sup><br>[µg/m³] | OMS <sup>(d)</sup><br>[µg/m³] | Panamá <sup>(e)</sup><br>[µg/m³] | Base del Umbral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------|---------------------------------|--------------------------------|---------------------------------|-------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| selenio   | 4.2                             | 0.2                            | 20                              | n/d                           | n/d                              | El nivel de análisis regional de la USEPA se basa en un estudio de humanos que consumen selenio. El umbral de inhalación crónica se basa en el umbral oral crónico para selenosis clínica del hígado, sangre, piel y SNC. El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OEHHA se basa en un estudio de 400 personas expuestas a diversos niveles de selenio ambiental. La exposición ocasionó selenosis del hígado, sangre, piel y sistema nervioso central. Se aplicó un factor de incertidumbre de 3 al NOAEL por variabilidad intraespecies. |
| plata     | n/d                             | 0.01                           | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| estroncio | n/d                             | 2                              | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| talio     | n/d                             | 0.1                            | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| titanio   | n/d                             | 5                              | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ para dióxido de titanio se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| uranio    | 0.062                           | 0.05                           | n/d                             | n/d                           | n/d                              | El nivel de análisis regional de la USEPA se basa en un NOAEL (0.05 mg/m³) para efectos histológicos y bioquímicos en perros. Se aplicaron factores de incertidumbre al NOAEL; 3 por extrapolación de animales a humanos y 10 por variabilidad en humanos. El NOAEL también se ajustó para exposición continua con el fin de derivar un umbral de inhalación. El umbral de la TCEQ para uranio soluble se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                 |
| vanadio   | n/d                             | 0.05                           | n/d                             | 1                             | n/d                              | El umbral de la OEHHA se basa en una mayor producción de mucosidad en humanos. El umbral de la TCEQ para material particulado se basa en un punto final de salud, pero no se cuenta con documentación de respaldo. El umbral de la OMS se basa en un LOAEL de 20 µg/m³ en base a síntomas crónicos de las vías respiratorias superiores. Se aplicó un factor de 20 ya que los efectos observados en esta concentración fueron mínimos y no se ha identificado una población susceptible.                                                                                                                                    |
| zinc      | n/d                             | 5                              | n/d                             | n/d                           | n/d                              | El umbral de la TCEQ para vapores o polvo de zinc se basa en un punto final de salud, pero no se cuenta con documentación de respaldo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

(a) Niveles de análisis regionales de la US EPA, USEPA 2009; las directrices para no cancerígenos se multiplicaron por 0.2 y para cancerígenos por 10 para convertir a un cociente de riesgo de 0.2 y a un ILCR de 1 x 10<sup>-5</sup>.  
(b) Texas Commission on Environmental Quality (Comisión de Calidad Ambiental de Texas) (TCEQ 2009) (sitio de Internet).  
(c) California Office of Environmental Health Hazard Assessment (Oficina de Evaluación de Peligros Ambientales para la Salud de California) (OEHHA 2008, sitio de Internet);  
(d) Organización Mundial de la Salud (OMS 2000; OMS 2005).  
(e) Anteproyecto de referencia de Panamá, Julio 2006  
(f) Se eligió el valor de la TCEQ para que ser consistente con la CRf utilizada en la evaluación con múltiples medios.

Notas: n/d = No disponible.  
Se utilizaron umbrales sombreados y en negrita en la evaluación de riesgos. Se utilizó la siguiente jerarquía para seleccionar el umbral empleado en el análisis de datos y la evaluación de riesgos: 1) OMS, 2) USEPA 3) OEHHA y 4) TCEQ.

Tabla 3-2      Análisis de Concentraciones Crónicas en el Aire Previstas Para el Caso de Impacto

| Concentració<br>n Anual<br>Promedio | CBR<br>Crónica | Río<br>Caimito | Palmilla | Nueva<br>Lucha | Parralito | Nuevo<br>Sinaí | San Benito | Molejones | Coclesito | Alrededores<br>del Cerco<br>Perimétrico | Máx      | Máx de<br>Línea Base | Máx de<br>Línea Base<br>+10% | ¿Conservado<br>Como CIP? <sup>(a)</sup> |
|-------------------------------------|----------------|----------------|----------|----------------|-----------|----------------|------------|-----------|-----------|-----------------------------------------|----------|----------------------|------------------------------|-----------------------------------------|
| Material Particulado                |                |                |          |                |           |                |            |           |           |                                         |          |                      |                              |                                         |
| PM <sub>2.5</sub>                   | 10             | 0.1            | 0.03     | 0.1            | 0.1       | 0.2            | 2.3        | 0.5       | 0.7       | 10                                      | 10       | -                    | -                            | No                                      |
| PM <sub>10</sub>                    | 50             | 29             | 26       | 34             | 26        | 40             | 26         | 20        | 78        | 55                                      | 78       | -                    | -                            | Sí                                      |
| PTS                                 | 90             | 3.38           | 0.02     | 0.07           | 0.09      | 0.41           | 3.85       | 0.91      | 0.65      | 34.93                                   | 34.93    | -                    | -                            | No                                      |
| Metales                             |                |                |          |                |           |                |            |           |           |                                         |          |                      |                              |                                         |
| aluminio                            | 1.04           | 0.030739       | 0.030290 | 0.041063       | 0.031845  | 0.051544       | 0.178078   | 0.044953  | 0.115391  | 1.103419                                | 1.103419 | 0.090588             | 0.099647                     | Sí <sup>(b)</sup>                       |
| antimonio                           | 0.5            | 0.013401       | 0.013400 | 0.017788       | 0.013400  | 0.020753       | 0.011741   | 0.010377  | 0.040497  | 0.013433                                | 0.040497 | 0.040496             | 0.044546                     | No                                      |
| arsénico                            | 0.0066         | 0.001183       | 0.001102 | 0.001466       | 0.001109  | 0.001728       | 0.000995   | 0.000865  | 0.003334  | 0.002194                                | 0.003334 | 0.003324             | 0.003657                     | No                                      |
| bario                               | 0.104          | 0.003752       | 0.003751 | 0.004982       | 0.003756  | 0.005824       | 0.003770   | 0.002973  | 0.011412  | 0.006728                                | 0.011412 | 0.011333             | 0.012466                     | No                                      |
| cadmio                              | 0.003          | 0.003467       | 0.003352 | 0.004455       | 0.003363  | 0.005228       | 0.003360   | 0.002705  | 0.010205  | 0.005550                                | 0.010205 | 0.010124             | 0.011137                     | No                                      |
| cromo (total)                       | 0.1            | 0.001508       | 0.000310 | 0.000428       | 0.000341  | 0.000673       | 0.001078   | 0.000384  | 0.001078  | 0.016637                                | 0.016637 | 0.000907             | 0.000997                     | No                                      |
| cromo VI                            | 0.0003         | 0.000006       | 0.000000 | 0.000001       | 0.000002  | 0.000003       | 0.000002   | 0.000002  | 0.000001  | 0.000144                                | 0.000144 | -                    | -                            | No                                      |
| cobalto                             | 0.0027         | 0.001512       | 0.001501 | 0.001994       | 0.001505  | 0.002335       | 0.001488   | 0.001197  | 0.004564  | 0.002496                                | 0.004564 | 0.004533             | 0.004987                     | No                                      |
| cobre                               | 1              | 0.731293       | 0.009429 | 0.020151       | 0.022669  | 0.119410       | 0.065369   | 0.028957  | 0.046500  | 6.662378                                | 6.662378 | 0.009973             | 0.010970                     | Sí <sup>(b)</sup>                       |
| hierro                              | 1              | 0.040064       | 0.039177 | 0.053772       | 0.042392  | 0.070261       | 0.348465   | 0.074808  | 0.167824  | 2.267020                                | 2.267020 | 0.116427             | 0.128070                     | Sí <sup>(b)</sup>                       |
| plomo                               | 0.5            | 0.005896       | 0.005041 | 0.006703       | 0.005062  | 0.007938       | 0.004601   | 0.003960  | 0.015274  | 0.016621                                | 0.016621 | 0.015211             | 0.016732                     | No                                      |
| manganeso                           | 0.15           | 0.000165       | 0.000114 | 0.000184       | 0.000176  | 0.000357       | 0.005487   | 0.000867  | 0.001189  | 0.038291                                | 0.038291 | 0.000302             | 0.000332                     | No                                      |
| mercurio                            | 1              | 0.003510       | 0.003500 | 0.004647       | 0.003502  | 0.005425       | 0.003127   | 0.002713  | 0.010584  | 0.003617                                | 0.010584 | 0.010577             | 0.011635                     | No                                      |
| molibdeno                           | 5              | 0.005026       | 0.005025 | 0.006672       | 0.005027  | 0.007788       | 0.004575   | 0.003916  | 0.015214  | 0.005625                                | 0.015214 | 0.015186             | 0.016705                     | No                                      |
| níquel                              | 0.025          | 0.007398       | 0.007377 | 0.009794       | 0.007381  | 0.011436       | 0.006594   | 0.005729  | 0.022308  | 0.007087                                | 0.022308 | 0.022288             | 0.024517                     | No                                      |
| selenio                             | 4.2            | 0.000415       | 0.000307 | 0.000415       | 0.000326  | 0.000520       | 0.000310   | 0.000268  | 0.000925  | 0.002793                                | 0.002793 | 0.000907             | 0.000997                     | No                                      |
| plata                               | 0.01           | 0.004804       | 0.004800 | 0.006373       | 0.004802  | 0.007438       | 0.004275   | 0.003735  | 0.014519  | 0.004667                                | 0.014519 | 0.014506             | 0.015957                     | No                                      |
| estroncio                           | 2              | 0.006778       | 0.006776 | 0.008999       | 0.006783  | 0.010515       | 0.006599   | 0.005341  | 0.020583  | 0.010641                                | 0.020583 | 0.020475             | 0.022522                     | No                                      |
| talio                               | 0.1            | 0.000000       | 0.000000 | 0.000000       | 0.000000  | 0.000000       | 0.000000   | 0.000000  | 0.000000  | 0.000003                                | 0.000003 | -                    | -                            | No                                      |
| titanio                             | 5              | 0.002749       | 0.002735 | 0.003658       | 0.002785  | 0.004385       | 0.007276   | 0.002808  | 0.009034  | 0.037082                                | 0.037082 | 0.008235             | 0.009059                     | No                                      |
| uranio                              | 0.062          | 0.000000       | 0.000000 | 0.000000       | 0.000000  | 0.000000       | 0.000003   | 0.000000  | 0.000001  | 0.000025                                | 0.000025 | -                    | -                            | No                                      |
| vanadio                             | 0.05           | 0.004313       | 0.000925 | 0.001268       | 0.000997  | 0.001933       | 0.001675   | 0.000911  | 0.002976  | 0.047201                                | 0.047201 | 0.002720             | 0.002992                     | No                                      |
| zinc                                | 5              | 0.004433       | 0.004403 | 0.005854       | 0.004420  | 0.006867       | 0.005026   | 0.003633  | 0.013500  | 0.011954                                | 0.013500 | 0.013297             | 0.014627                     | No                                      |

<sup>(a)</sup> Los compuestos se conservaron como CIP si excedieron el umbral de análisis crónico y presentaron un aumento de por lo menos 10% sobre las concentraciones de línea base.  
<sup>(b)</sup> Los efectos crónicos de estas sustancias se incluyeron en la evaluación con múltiples medios ya que también se encuentran presentes en el suelo, agua y productos alimenticios.

Notas: Todas las concentraciones están en µg/m<sup>3</sup>. CBR = Concentración basada en riesgos.

**Tabla 3-3 Concentraciones de Referencia Para Químicos de Interés  
Potencial Incluidos en la Evaluación de Riesgos de la Calidad del  
Aire a Largo Plazo - No Cancerígenos**

| Parámetro            | Concentración de Referencia<br>[µg/m³] |                                 |                      |                     |                                 |                      | Puntos Finales Toxicológicos y Derivaciones                                                                                                                                                            |
|----------------------|----------------------------------------|---------------------------------|----------------------|---------------------|---------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                      | OMS <sup>(a)</sup>                     | U.S. EPA<br>IRIS <sup>(b)</sup> | ATSDR <sup>(c)</sup> | RIVM <sup>(d)</sup> | Health<br>Canada <sup>(e)</sup> | Otros <sup>(f)</sup> |                                                                                                                                                                                                        |
| Material Particulado |                                        |                                 |                      |                     |                                 |                      |                                                                                                                                                                                                        |
| PM <sub>10</sub>     | n/d                                    | n/d                             | n/d                  | n/d                 | n/d                             | n/d                  | No se cuenta con una CRF para PM <sub>10</sub> . Por lo tanto, el cociente de riesgo se calculará de acuerdo con el criterio de análisis de 50 ug/m³ de la OMS ya que no existen estándares panameños. |

(a) Organización Mundial de la Salud (OMS, 2000)

(b) U.S. EPA IRIS (U.S. EPA 2010a, sitio de Internet).

(c) Agencia para el Registro de Sustancias Tóxicas y Enfermedades (ASTDR 2010, sitio de Internet).

(d) RIVM Instituto Nacional de Salud Pública y Medio Ambiente (RIVM 2001).

(e) Health Canada. 2009 (Health Canada 2009).

(f) La fuente de la CRf se explica en la sección de punto final toxicológico, ya que se disponía de CRf de otras jurisdicciones.

Notas: n/d = No disponible. Se utilizaron CRf en negrita en la evaluación de riesgo. Evaluación de Exposición

### 3.1.2 Evaluación de la Exposición

La evaluación de exposición es el proceso de estimar la exposición de un receptor humano a una sustancia bajo un escenario de exposición determinado. Se llevó a cabo una evaluación de exposición para cada QIP identificado (Sección 1.2.1). Las exposiciones se calcularon en base a concentraciones promedio anuales previstas. Se evaluó la vía de inhalación de aire crónica comparando directamente las concentraciones promedio anuales con las CRf.

### 3.1.3 Caracterización de Riesgos

Los efectos crónicos en la salud se evaluaron calculando CR. Un CR es la proporción entre la exposición que probablemente tenga la persona y la cantidad de exposición que se considera segura. No se prevé riesgos para la salud si el CR es menor a uno.

Cuando el CR es mayor a uno, los escenarios plantean un interés potencial y requieren mayor evaluación. Sin embargo, los valores de CR mayores que uno no necesariamente indican que ocurrirán efectos nocivos para la salud, puesto que se ha incluido un amplio margen de seguridad en su estimación.

Durante la etapa de caracterización de riesgos, se calcularon valores de CR para QIP no cancerígenos como la proporción de la concentración prevista en el aire con respecto a la CRf, de acuerdo con la siguiente ecuación:

$$\text{CR} = \text{concentración de QIP en el aire } (\mu\text{g}/\text{m}^3) / \text{CRf } (\mu\text{g}/\text{m}^3)$$

Un CR menor o igual a 1 indica que la exposición estimada es menor a la concentración de referencia, lo que significa impactos insignificantes en la salud.

### 3.1.4 Resultados de la Evaluación de Inhalación

En la Tabla 3-4 se muestran los cocientes de riesgo de inhalación crónica para todos los QIP. Los contaminantes con cocientes de riesgo mayores que uno (por ejemplo, PM<sub>10</sub>) se conservaron para una evaluación más exhaustiva (Tabla 3-5). Los datos de material particulado no eran adecuados para utilizarse en una evaluación cuantitativa debido a las restricciones mencionadas anteriormente, por lo que se utilizó una comparación con el umbral de análisis para realizar una evaluación cualitativa como se describe más a fondo en la evaluación de la magnitud de los efectos. Los resultados de la evaluación de aire crónica para PM<sub>10</sub> se resumen a continuación:

- Se identificó que PM<sub>10</sub> tiene un CR mayor a 1 en Coclesito y en los alrededores del cerco perimétrico (CR=1.6 y 1.1 respectivamente). No se disponía una concentración de referencia para material particulado por lo que los CR se calcularon utilizando los criterios de análisis panameños para PM<sub>10</sub> con fines de análisis. Debido a los CR bajos, es probable que los riesgos para la salud asociados con estas excedencias sean bajos.

Tabla 3-4 Cocientes de Riesgo de Inhalación Crónica

| Parámetro            | CRf<br>[µg/m³] | Cocientes de Riesgo Para Concentraciones Crónicas en el Aire en Comunidades Regionales |          |             |           |             |            |               |           |                                   |
|----------------------|----------------|----------------------------------------------------------------------------------------|----------|-------------|-----------|-------------|------------|---------------|-----------|-----------------------------------|
|                      |                | Río Caimito                                                                            | Palmilla | Nueva Lucha | Parralito | Nuevo Sinaí | San Benito | Los Molejones | Coclesito | Alrededores del Cerco Perimétrico |
| Material Particulado |                |                                                                                        |          |             |           |             |            |               |           |                                   |
| PM <sub>10</sub>     | 50             | 5.87E-01                                                                               | 5.16E-01 | 6.85E-01    | 5.18E-01  | 8.11E-01    | 5.12E-01   | 4.11E-01      | 1.57E00   | 1.10E00                           |

(a) Concentración basada en riesgos de la TCEQ.  
(b) La CRf se derivó de una RfD de 0.7 mg/kg al día de la US EPA NCEA (2006 utilizando el peso corporal y frecuencia de inhalación para un niño pequeño (0.7 / 9.3 \*16.5 = 1.242 mg/m³).  
Notas: Las unidades están en µg/m3. Los cocientes de riesgo mayores que 1 están en negrita.

Tabla 3-5 Análisis Complementario de PM<sub>10</sub> (Efectos Crónicos) y Determinación de la Magnitud del Efecto

| Criterios de Análisis                                                 | Comentarios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| comparación de las concentraciones previstas con los límites crónicos | - Los CR crónicos fueron de menores a 1 en todos los lugares excepto por Coclesito y los alrededores del cerco perimétrico donde éstos fueron de 1.6 y 1.1 respectivamente.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| conservadurismo en los límites crónicos para material particulado     | - El umbral de PM <sub>10</sub> (50 µg/m³) utilizado para fines de análisis es de la Autoridad Nacional de Aire Ambiental de Panamá (2006).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| efectos crónicos potenciales del material particulado en la salud     | - Los efectos en la salud relacionados con la exposición a largo plazo a PM son principalmente efectos respiratorios y cardiovasculares, así como mortalidad (OMS 2005) y pueden asociarse a cualquier incremento de las concentraciones de PM sobre el fondo;<br>- Las relaciones epidemiológicas pueden utilizarse para calcular el aumento de incidencias anuales de mortalidad y morbilidad con respecto a los cambios previstos de las condiciones de fondo;<br>- Sin embargo, de acuerdo con una búsqueda de material bibliográfico, aún no se han desarrollado relaciones epidemiológicas para países centroamericanos y la extrapolación de un contexto norte/sudamericano de centros urbanos con un alto porcentaje de fuentes relacionadas con combustión no es adecuada para la selva panameña.                                                                                                                                                                         |
| magnitud del efecto                                                   | - La concentración pico anual prevista para material particulado (PM <sub>10</sub> ) excede los criterios de calidad de aire elegidos en Coclesito y los alrededores del cerco perimétrico, sin embargo, el CR es sólo ligeramente mayor a 1;<br>- También existe incertidumbre asociada a las concentraciones de línea base de PM <sub>10</sub> previstas ya que se han escalado de datos recolectados en Río Caimito en base al tamaño de la población, debido a problemas con la calidad de los datos con respecto a las muestras recogidas en el campamento Colina.<br>- Debido a las restricciones antes mencionadas, los datos no son adecuados para utilizarse en una evaluación cuantitativa de la relación epidemiológica para determinar un aumento en las incidencias de mortalidad y morbilidad;<br>- De acuerdo con esta información, la magnitud el efecto para PM <sub>10</sub> se considera baja y la incertidumbre subyacente se tratará con monitoreo adicional. |



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**ANEXO XIX**

**APÉNDICE J**

**Evaluación de Riesgos en Múltiples Medios**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-018**

Tabla 1      Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimados del Límite Superior

| Parámetro      | Agua –<br>Suministro<br>de Agua<br>de la<br>Comunidad<br>[mg/L] | Agua del<br>Mar<br>[mg/L] | Agua –<br>Área de<br>Estudio<br>Local<br>[mg/L] | Sedimentos<br>Agua Dulce<br>[mg/kg] | Sedimentos<br>- Marinos/<br>Estuarinos<br>[mg/kg] | Peces –<br>Agua Dulce<br>[mg/kg ww] | Peces -<br>Marinos/<br>Estuarinos<br>[mg/kg ww] | Suelo<br>[mg/kg] | Cultivos –<br>Frutas<br>[mg/kg ww] | Cultivos–<br>Arroz<br>[mg/kg ww] | Alimentos<br>Carne<br>[mg/kg ww] | Alimentos<br>Pollo<br>[mg/kg ww] | Aire –<br>Costero<br>[mg/m³] | Aire –<br>Agrícola<br>[mg/m³] | Aire –<br>Indígena<br>[mg/m³] | Aire –<br>Cerco<br>[mg/m³] |
|----------------|-----------------------------------------------------------------|---------------------------|-------------------------------------------------|-------------------------------------|---------------------------------------------------|-------------------------------------|-------------------------------------------------|------------------|------------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------------|-------------------------------|-------------------------------|----------------------------|
| Metales        |                                                                 |                           |                                                 |                                     |                                                   |                                     |                                                 |                  |                                    |                                  |                                  |                                  |                              |                               |                               |                            |
| Aluminio (NC)  | 1.15E-01                                                        | 4.57E-01                  | 7.94E-01                                        | 2.52E+04                            | 7.86E+03                                          | 1.65E+02                            | 4.40E+01                                        | 4.36E+04         | 7.248384                           | 1.59E+01                         | 4.49E-01                         | 9.73E-01                         | 3.00E-05                     | 9.06E-05                      | 4.64E-05                      | 2.63E-05                   |
| Arsénico (C)   | 2.50E-04                                                        | 1.00E-02                  | 1.00E-03                                        | 1.00E+01                            | 1.30E+01                                          | 1.75E-01                            | 3.30E-01                                        | 5.00E+00         | 0.00768                            | 1.69E-02                         | 2.50E-05                         | 8.64E-05                         | 1.10E-06                     | 3.32E-06                      | 1.70E-06                      | 1.10E-06                   |
| Bario (NC)     | 3.10E-02                                                        | 2.83E-02                  | 2.16E-02                                        | 1.47E+02                            | 7.70E+00                                          | 1.65E+01                            | 3.40E+00                                        | 1.42E+02         | 8.0564224                          | 1.18E+01                         | 3.26E-04                         | 5.19E-04                         | 3.75E-06                     | 1.13E-05                      | 5.81E-06                      | 3.29E-06                   |
| Cadmio (C)     | 1.05E-04                                                        | 2.00E-04                  | 2.00E-04                                        | 5.00E-01                            | 5.00E-01                                          | 1.58E-01                            | 3.72E-02                                        | 1.03E+00         | 0.0394368                          | 8.66E-02                         | 3.96E-06                         | 4.51E-05                         | 3.35E-06                     | 1.01E-05                      | 5.19E-06                      | 2.93E-06                   |
| Cromo (C)      | 4.50E-04                                                        | 1.50E-03                  | 1.00E-03                                        | 4.86E+01                            | 3.31E+01                                          | 2.41E+00                            | 9.00E-01                                        | 2.49E+02         | 0.286272                           | 2.96E+01                         | 6.87E-03                         | 1.97E-02                         | 3.00E-07                     | 9.07E-07                      | 4.65E-07                      | 3.00E-07                   |
| Cobalto (NC)   | 2.50E-04                                                        | 1.00E-03                  | 1.00E-03                                        | 2.70E+01                            | 1.47E+01                                          | 2.46E-01                            | 6.00E-02                                        | 2.73E+01         | 0.04890368                         | 1.29E-01                         | 1.25E-03                         | 1.00E-02                         | 1.50E-06                     | 4.53E-06                      | 2.32E-06                      | 1.31E-06                   |
| Cobre (NC)     | 5.90E-03                                                        | 1.65E-02                  | 1.20E-02                                        | 2.77E+02                            | 1.00E+01                                          | 2.52E+00                            | 8.60E-01                                        | 6.31E+02         | 66.0996352                         | 2.84E+01                         | 1.46E-01                         | 5.73E-02                         | 3.30E-06                     | 9.97E-06                      | 5.11E-06                      | 3.30E-06                   |
| Hierro (NC)    | 1.75E-01                                                        | 5.25E-01                  | 5.73E-01                                        | 6.22E+04                            | 4.01E+04                                          |                                     |                                                 | 1.13E+05         | 28.9792                            | 6.36E+01                         | 6.13E-02                         | 1.03E-01                         | 3.85E-05                     | 1.16E-04                      | 5.97E-05                      | 3.38E-05                   |
| Plomo (NC)     | 4.00E-04                                                        | 1.00E-03                  | 1.00E-03                                        | 1.79E+01                            | 5.00E+00                                          | 5.91E-01                            | 7.60E-02                                        | 3.00E+01         | 0.009216                           | 1.52E-01                         | 1.68E-05                         | 1.15E-03                         | 5.03E-06                     | 1.52E-05                      | 7.79E-06                      | 5.03E-06                   |
| Manganeso (NC) | 6.00E-02                                                        | 6.40E-02                  | 5.62E-02                                        | 1.13E+03                            | 4.48E+02                                          | 3.96E+01                            | 1.18E+01                                        | 1.99E+03         | 25.5232                            | 5.60E+01                         | 5.56E-01                         | 2.38E-01                         | 1.00E-07                     | 3.02E-07                      | 1.55E-07                      | 8.76E-08                   |
| Mercurio (NC)  | 2.00E-05                                                        | 2.00E-05                  | 2.00E-05                                        | 3.00E-02                            | 1.00E-02                                          | 4.61E-02                            | 1.39E-01                                        | 1.56E-01         | 0.00293951                         | 1.05E-02                         | 5.85E-04                         | 6.41E-03                         | 3.50E-06                     | 1.06E-05                      | 5.42E-06                      | 3.07E-06                   |
| Molibdeno (NC) | 1.00E-04                                                        | 1.25E-02                  | 6.00E-04                                        | 9.92E+00                            | 4.00E+00                                          | 2.24E-01                            | 5.08E-02                                        | 4.13E+01         | 0.6345216                          | 1.39E+00                         | 9.24E-04                         | 2.10E-03                         | 5.03E-06                     | 1.52E-05                      | 7.78E-06                      | 4.40E-06                   |
| Níquel (C)     | 5.50E-04                                                        | 2.00E-03                  | 1.00E-03                                        | 1.24E+01                            | 8.70E+00                                          | 1.31E+00                            | 4.24E-01                                        | 1.83E+01         | 0.2815488                          | 4.93E+00                         | 1.08E-03                         | 3.68E-03                         | 7.38E-06                     | 2.23E-05                      | 1.14E-05                      | 6.50E-06                   |
| Selenio (NC)   | 6.50E-04                                                        | 1.00E-03                  | 1.00E-03                                        | 2.00E+00                            | 2.00E+00                                          | 6.97E-01                            | 9.01E-01                                        | 4.40E+00         | 0.02816                            | 6.18E-02                         | 8.68E-04                         | 4.14E-03                         | 3.00E-07                     | 9.07E-07                      | 4.65E-07                      | 3.00E-07                   |
| Vanadio (NC)   | 1.10E-03                                                        | 4.00E-03                  | 2.00E-03                                        | 1.66E+02                            | 1.80E+02                                          | 6.32E-01                            | 3.68E-01                                        | 3.82E+02         | 0.2934528                          | 6.44E-01                         | 1.63E-03                         | 1.02E-02                         | 9.00E-07                     | 2.72E-06                      | 1.39E-06                      | 9.00E-07                   |
| Zinc (NC)      | 2.10E-02                                                        | 5.00E-03                  | 5.00E-03                                        | 1.47E+02                            | 5.79E+01                                          | 3.48E+01                            | 3.79E+01                                        | 1.15E+02         | 11.1873792                         | 4.09E+01                         | 6.10E-01                         | 7.96E-01                         | 4.40E-06                     | 1.33E-05                      | 6.81E-06                      | 3.85E-06                   |

Notas: Las tendencias centrales utilizaron como modelo las concentraciones de entrada para el medio ambiental: promedio para los datos distribuidos normalmente, geomedia para datos de registro normal y media para datos no paramétricos o datos que en su mayor parte no se detectaron.

**Tabla 2      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 6.27E-03           | 6.27E-03            | 3.96E-04              | 4.76E-05 | 3.96E-04      | 4.76E-05 | 1.09E-02      | 8.74E-04               | 1.09E-02                    | 8.74E-04 | 5.33E-03   | 5.33E-03   |
| Arsénico (C)              | 1.36E-05           | 4.55E-02            | 8.66E-06              | 1.04E-06 | 2.89E-02      | 3.47E-03 | 1.80E-05      | 4.34E-07               | 6.00E-02                    | 1.45E-03 | 4.00E-05   | 1.33E-01   |
| Bario (NC)                | 1.69E-03           | 8.45E-03            | 2.45E-05              | 2.94E-06 | 1.22E-04      | 1.47E-05 | 1.07E-05      | 8.56E-07               | 5.33E-05                    | 4.28E-06 | 4.11E-04   | 2.06E-03   |
| Cadmio (C)                | 5.73E-06           | 1.15E-02            | 1.73E-07              | 2.08E-08 | 3.46E-04      | 4.17E-05 | 6.93E-07      | 5.56E-09               | 6.93E-04                    | 5.56E-06 | 4.50E-06   | 4.50E-03   |
| Cromo (C)                 | 2.45E-05           | 8.18E-03            | 1.30E-06              | 1.56E-07 | 4.33E-04      | 5.21E-05 | 4.59E-05      | 3.68E-06               | 1.53E-02                    | 1.23E-03 | 1.09E-04   | 3.63E-02   |
| Cobalto (NC)              | 1.36E-05           | 4.55E-02            | 8.66E-07              | 4.17E-08 | 2.89E-03      | 1.39E-04 | 2.04E-05      | 1.63E-07               | 6.79E-02                    | 5.45E-04 | 7.27E-06   | 2.42E-02   |
| Cobre (NC)                | 3.22E-04           | 3.58E-03            | 1.43E-05              | 1.72E-06 | 1.59E-04      | 1.91E-05 | 1.39E-05      | 6.67E-07               | 1.54E-04                    | 7.41E-06 | 1.04E-04   | 1.16E-03   |
| Hierro (NC)               | 9.55E-03           | 1.36E-02            | 4.55E-04              | 5.47E-05 | 6.49E-04      | 7.82E-05 | 5.55E-02      | 4.45E-03               | 7.93E-02                    | 6.36E-03 | NA         | NA         |
| Plomo (NC)                | 2.18E-05           | 6.06E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 6.93E-06      | 3.34E-08               | 1.92E-03                    | 9.26E-06 | 9.20E-06   | 2.56E-03   |
| Manganeso (NC)            | 3.27E-03           | 5.45E-02            | 5.54E-05              | 6.67E-06 | 9.24E-04      | 1.11E-04 | 6.20E-04      | 4.97E-05               | 1.03E-02                    | 8.29E-04 | 1.43E-03   | 2.38E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 1.73E-08              | 2.08E-09 | 8.66E-06      | 1.04E-06 | 1.39E-08      | 1.11E-09               | 6.93E-06                    | 5.56E-07 | 1.68E-05   | 1.68E-01   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 1.08E-05              | 1.30E-06 | 2.16E-03      | 2.61E-04 | 5.54E-06      | 4.45E-08               | 1.11E-03                    | 8.89E-06 | 6.15E-06   | 1.23E-03   |
| Níquel (C)                | 3.00E-05           | 2.50E-03            | 1.73E-06              | 4.17E-08 | 1.44E-04      | 3.47E-06 | 1.21E-05      | 1.93E-06               | 1.00E-03                    | 1.61E-04 | 5.13E-05   | 4.28E-03   |
| Selenio (NC)              | 3.55E-05           | 7.09E-03            | 8.66E-07              | 1.04E-07 | 1.73E-04      | 2.08E-05 | 2.77E-06      | 2.22E-08               | 5.54E-04                    | 4.45E-06 | 1.09E-04   | 2.18E-02   |
| Vanadio (NC)              | 6.00E-05           | 1.19E-02            | 3.46E-06              | 4.17E-07 | 6.87E-04      | 8.27E-05 | 2.50E-04      | 2.01E-05               | 4.96E-02                    | 3.98E-03 | 4.46E-05   | 8.84E-03   |
| Zinc (NC)                 | 1.15E-03           | 3.82E-03            | 4.33E-06              | 3.13E-07 | 1.44E-05      | 1.04E-06 | 8.02E-05      | 6.44E-06               | 2.67E-04                    | 2.15E-05 | 4.58E-03   | 1.53E-02   |

**Tabla 2**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                        |                        |                        |                        |            |            |               |            |            |          |            |           |          |            |            |            |          |
|---------------------------|------------------------|------------------------|------------------------|------------------------|------------|------------|---------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País  |                        |                        |                        |            |            |               |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposició<br>n - Fruta | Exposició<br>n - Arroz | Exposició<br>n - Carne | Exposició<br>n - Pollo | CP - Fruta | CP - Arroz | CP -<br>Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión              | Ingestión              | Ingestión              | Ingestión              | Ingestión  | Ingestión  | Ingestión     | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                        |                        |                        |                        |            |            |               |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 5.29E-03               | 1.42E-02               | 1.01E-05               | 5.31E-04               | 5.29E-03   | 1.42E-02   | 1.01E-05      | 5.31E-04   | 2.11E-01   | 4.84E-03 | 7.41E-07   | 2.11E-01  | 4.84E-03 | 2.63E-04   | 2.50E-06   | 5.00E-04   | 2.61E-01 |
| Arsénico (C)              | 5.60E-06               | 1.51E-05               | 5.62E-10               | 4.71E-08               | 1.87E-02   | 5.03E-02   | 1.87E-06      | 1.57E-04   | 2.42E-05   | 1.67E-07 | 8.51E-11   | 8.08E-02  | 5.56E-04 | NA         | 9.17E-08   | NA         | 4.23E-01 |
| Bario (NC)                | 5.88E-03               | 1.05E-02               | 7.33E-09               | 2.83E-07               | 2.94E-02   | 5.27E-02   | 3.66E-08      | 1.42E-06   | 6.90E-04   | 1.58E-05 | 2.42E-09   | 3.45E-03  | 7.92E-05 | 8.60E-06   | 3.13E-07   | 6.25E-04   | 9.69E-02 |
| Cadmio (C)                | 2.88E-05               | 7.75E-05               | 8.90E-11               | 2.46E-08               | 2.88E-02   | 7.75E-02   | 8.90E-08      | 2.46E-05   | 4.98E-06   | 1.14E-08 | 1.75E-11   | 4.98E-03  | 1.14E-05 | NA         | 2.79E-07   | NA         | 1.28E-01 |
| Cromo (C)                 | 2.09E-04               | 2.65E-02               | 1.54E-07               | 1.07E-05               | 6.96E-02   | 8.84E+00   | 5.14E-05      | 3.58E-03   | 1.20E-03   | 2.76E-05 | 4.23E-09   | 4.02E-01  | 9.21E-03 | 7.50E-05   | 2.50E-08   | 2.50E-04   | 9.38E+00 |
| Cobalto (NC)              | 3.57E-05               | 1.15E-04               | 2.81E-08               | 5.48E-06               | 1.19E-01   | 3.84E-01   | 9.36E-05      | 1.83E-02   | 1.32E-04   | 3.03E-07 | 4.64E-10   | 4.41E-01  | 1.01E-03 | 1.37E-04   | 1.25E-07   | 2.08E-02   | 1.13E+00 |
| Cobre (NC)                | 4.82E-02               | 2.54E-02               | 3.27E-06               | 3.13E-05               | 5.36E-01   | 2.82E-01   | 3.64E-05      | 3.47E-04   | 3.06E-03   | 4.21E-05 | 1.07E-08   | 3.40E-02  | 4.68E-04 | 1.91E-05   | 2.75E-07   | 2.75E-04   | 8.58E-01 |
| Hierro (NC)               | 2.11E-02               | 5.70E-02               | 1.38E-06               | 5.61E-05               | 3.02E-02   | 8.14E-02   | 1.97E-06      | 8.01E-05   | 5.49E-01   | 1.26E-02 | 1.93E-06   | 7.84E-01  | 1.80E-02 | NA         | 3.21E-06   | NA         | 9.02E-01 |
| Plomo (NC)                | 6.72E-06               | 1.36E-04               | 3.77E-10               | 6.29E-07               | 1.87E-03   | 3.77E-02   | 1.05E-07      | 1.75E-04   | 1.45E-04   | 2.00E-07 | 5.11E-10   | 4.04E-02  | 5.56E-05 | NA         | 4.19E-07   | NA         | 9.10E-02 |
| Manganeso (NC)            | 1.86E-02               | 5.02E-02               | 1.25E-05               | 1.30E-04               | 3.10E-01   | 8.36E-01   | 2.08E-04      | 2.17E-03   | 9.67E-03   | 2.22E-04 | 3.39E-08   | 1.61E-01  | 3.69E-03 | 1.20E-03   | 8.33E-09   | 1.67E-04   | 1.41E+00 |
| Mercurio (NC)             | 2.14E-06               | 9.41E-06               | 1.31E-08               | 3.50E-06               | 2.14E-02   | 9.41E-02   | 1.31E-04      | 3.50E-02   | 7.55E-07   | 1.73E-08 | 2.65E-12   | 3.78E-04  | 8.66E-06 | 1.57E-08   | 2.92E-07   | 9.72E-04   | 3.20E-01 |
| Molibdeno (NC)            | 4.63E-04               | 1.25E-03               | 2.07E-08               | 1.15E-06               | 9.26E-02   | 2.49E-01   | 4.15E-06      | 2.29E-04   | 2.00E-04   | 4.59E-07 | 7.03E-10   | 4.01E-02  | 9.18E-05 | 1.04E-07   | 4.19E-07   | 3.49E-05   | 3.88E-01 |
| Níquel (C)                | 2.05E-04               | 4.42E-03               | 2.43E-08               | 2.01E-06               | 1.71E-02   | 3.68E-01   | 2.03E-06      | 1.67E-04   | 8.89E-05   | 4.08E-06 | 3.12E-10   | 7.41E-03  | 3.40E-04 | 3.07E-05   | 6.15E-07   | 3.41E-02   | 4.35E-01 |
| Selenio (NC)              | 2.05E-05               | 5.53E-05               | 1.95E-08               | 2.26E-06               | 4.11E-03   | 1.11E-02   | 3.90E-06      | 4.52E-04   | 2.13E-05   | 4.89E-08 | 7.49E-11   | 4.27E-03  | 9.78E-06 | NA         | NA         | NA         | 4.96E-02 |
| Vanadio (NC)              | 2.14E-04               | 5.77E-04               | 3.65E-08               | 5.58E-06               | 4.25E-02   | 1.14E-01   | 7.24E-06      | 1.11E-03   | 1.85E-03   | 4.25E-05 | 6.50E-09   | 3.68E-01  | 8.43E-03 | NA         | 7.50E-08   | NA         | 6.09E-01 |
| Zinc (NC)                 | 8.16E-03               | 3.66E-02               | 1.37E-05               | 4.35E-04               | 2.72E-02   | 1.22E-01   | 4.57E-05      | 1.45E-03   | 5.56E-04   | 1.28E-05 | 1.95E-09   | 1.85E-03  | 4.25E-05 | NA         | 3.67E-07   | NA         | 1.72E-01 |

<sup>(a)</sup>
Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Nota: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 3      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.66E-03           | 3.66E-03            | 9.23E-05              | 3.36E-05 | 9.23E-05      | 3.36E-05 | 6.36E-04      | 5.02E-04               | 6.36E-04                    | 5.02E-04 | 5.33E-03   | 5.33E-03   |
| Arsénico (C)              | 7.96E-06           | 2.65E-02            | 2.02E-06              | 7.36E-07 | 6.74E-03      | 2.45E-03 | 1.05E-06      | 2.49E-07               | 3.50E-03                    | 8.31E-04 | 4.00E-05   | 1.33E-01   |
| Bario (NC)                | 9.87E-04           | 4.93E-03            | 5.71E-06              | 2.08E-06 | 2.85E-05      | 1.04E-05 | 6.22E-07      | 4.92E-07               | 3.11E-06                    | 2.46E-06 | 4.11E-04   | 2.06E-03   |
| Cadmio (C)                | 3.34E-06           | 6.68E-03            | 4.04E-08              | 1.47E-08 | 8.08E-05      | 2.95E-05 | 4.04E-08      | 3.19E-09               | 4.04E-05                    | 3.19E-06 | 4.50E-06   | 4.50E-03   |
| Cromo (C)                 | 1.43E-05           | 4.77E-03            | 3.03E-07              | 1.10E-07 | 1.01E-04      | 3.68E-05 | 2.68E-06      | 2.11E-06               | 8.92E-04                    | 7.05E-04 | 1.09E-04   | 3.63E-02   |
| Cobalto (NC)              | 7.96E-06           | 2.65E-02            | 2.02E-07              | 2.95E-08 | 6.74E-04      | 9.82E-05 | 1.19E-06      | 9.39E-08               | 3.96E-03                    | 3.13E-04 | 7.27E-06   | 2.42E-02   |
| Cobre (NC)                | 1.88E-04           | 1.88E-03            | 3.33E-06              | 1.21E-06 | 3.33E-05      | 1.21E-05 | 8.08E-07      | 3.83E-07               | 8.08E-06                    | 3.83E-06 | 1.04E-04   | 1.04E-03   |
| Hierro (NC)               | 5.57E-03           | 7.96E-03            | 1.06E-04              | 3.87E-05 | 1.52E-04      | 5.52E-05 | 3.24E-03      | 2.56E-03               | 4.63E-03                    | 3.66E-03 | NA         | NA         |
| Plomo (NC)                | 1.27E-05           | 3.54E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 4.04E-07      | 1.92E-08               | 1.12E-04                    | 5.32E-06 | 9.20E-06   | 2.56E-03   |
| Manganeso (NC)            | 1.91E-03           | 3.18E-02            | 1.29E-05              | 4.71E-06 | 2.16E-04      | 7.85E-05 | 3.62E-05      | 2.86E-05               | 6.03E-04                    | 4.77E-04 | 1.43E-03   | 2.38E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 4.04E-09              | 1.47E-09 | 2.02E-06      | 7.36E-07 | 8.08E-10      | 6.39E-10               | 4.04E-07                    | 3.19E-07 | 1.68E-05   | 1.68E-01   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 2.53E-06              | 9.20E-07 | 5.05E-04      | 1.84E-04 | 3.23E-07      | 2.56E-08               | 6.47E-05                    | 5.11E-06 | 6.15E-06   | 1.23E-03   |
| Níquel (C)                | 1.75E-05           | 1.46E-03            | 4.04E-07              | 2.95E-08 | 3.37E-05      | 2.45E-06 | 7.03E-07      | 1.11E-06               | 5.86E-05                    | 9.26E-05 | 5.13E-05   | 4.28E-03   |
| Selenio (NC)              | 2.07E-05           | 4.14E-03            | 2.02E-07              | 7.36E-08 | 4.04E-05      | 1.47E-05 | 1.62E-07      | 1.28E-08               | 3.23E-05                    | 2.56E-06 | 1.09E-04   | 2.18E-02   |
| Vanadio (NC)              | 3.50E-05           | 6.95E-03            | 8.08E-07              | 2.95E-07 | 1.60E-04      | 5.84E-05 | 1.46E-05      | 1.15E-05               | 2.89E-03                    | 2.29E-03 | 4.46E-05   | 8.84E-03   |
| Zinc (NC)                 | 6.68E-04           | 2.23E-03            | 1.01E-06              | 2.21E-07 | 3.37E-06      | 7.36E-07 | 4.68E-06      | 3.70E-06               | 1.56E-05                    | 1.23E-05 | 4.58E-03   | 1.53E-02   |

Tabla 3 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 5.29E-03              | 1.42E-02           | 1.01E-05           | 5.31E-04           | 5.29E-03   | 1.42E-02   | 1.01E-05   | 5.31E-04   | 1.23E-02   | 2.78E-03 | 2.94E-07   | 1.23E-02  | 2.78E-03 | 2.63E-04   | 2.50E-06   | 5.00E-04   | 4.62E-02 |
| Arsénico (C)              | 5.60E-06              | 1.51E-05           | 5.62E-10           | 4.71E-08           | 1.87E-02   | 5.03E-02   | 1.87E-06   | 1.57E-04   | 1.41E-06   | 9.58E-08 | 3.37E-11   | 4.71E-03  | 3.19E-04 | NA         | 9.17E-08   | NA         | 2.48E-01 |
| Bario (NC)                | 5.88E-03              | 1.05E-02           | 7.33E-09           | 2.83E-07           | 2.94E-02   | 5.27E-02   | 3.66E-08   | 1.42E-06   | 4.03E-05   | 9.10E-06 | 9.61E-10   | 2.01E-04  | 4.55E-05 | 8.60E-06   | 3.13E-07   | 6.25E-04   | 9.00E-02 |
| Cadmio (C)                | 2.88E-05              | 7.75E-05           | 8.90E-11           | 2.46E-08           | 2.88E-02   | 7.75E-02   | 8.90E-08   | 2.46E-05   | 2.91E-07   | 6.56E-09 | 6.93E-12   | 2.91E-04  | 6.56E-06 | #DIV/0!    | 2.79E-07   | NA         | 1.18E-01 |
| Cromo (C)                 | 2.09E-04              | 2.65E-02           | 1.54E-07           | 1.07E-05           | 6.96E-02   | 8.84E+00   | 5.14E-05   | 3.58E-03   | 7.03E-05   | 1.59E-05 | 1.68E-09   | 2.34E-02  | 5.29E-03 | 7.50E-05   | 2.50E-08   | 2.50E-04   | 8.98E+00 |
| Cobalto (NC)              | 3.57E-05              | 1.15E-04           | 2.81E-08           | 5.48E-06           | 1.19E-01   | 3.84E-01   | 9.36E-05   | 1.83E-02   | 7.72E-06   | 1.74E-07 | 1.84E-10   | 2.57E-02  | 5.81E-04 | 1.37E-04   | 1.25E-07   | 2.08E-02   | 6.25E-01 |
| Cobre (NC)                | 4.82E-02              | 2.54E-02           | 3.27E-06           | 3.13E-05           | 4.82E-01   | 2.54E-01   | 3.27E-05   | 3.13E-04   | 1.79E-04   | 2.42E-05 | 4.26E-09   | 1.79E-03  | 2.42E-04 | 1.91E-05   | 2.75E-07   | 2.75E-04   | 7.42E-01 |
| Hierro (NC)               | 2.11E-02              | 5.70E-02           | 1.38E-06           | 5.61E-05           | 3.02E-02   | 8.14E-02   | 1.97E-06   | 8.01E-05   | 3.20E-02   | 7.23E-03 | 7.64E-07   | 4.57E-02  | 1.03E-02 | NA         | 3.21E-06   | NA         | 7.25E-02 |
| Plomo (NC)                | 6.72E-06              | 1.36E-04           | 3.77E-10           | 6.29E-07           | 1.87E-03   | 3.77E-02   | 1.05E-07   | 1.75E-04   | 8.49E-06   | 1.15E-07 | 2.02E-10   | 2.36E-03  | 3.19E-05 | NA         | 4.19E-07   | NA         | 4.84E-02 |
| Manganeso (NC)            | 1.86E-02              | 5.02E-02           | 1.25E-05           | 1.30E-04           | 3.10E-01   | 8.36E-01   | 2.08E-04   | 2.17E-03   | 5.64E-04   | 1.27E-04 | 1.35E-08   | 9.40E-03  | 2.12E-03 | 1.20E-03   | 8.33E-09   | 1.67E-04   | 1.22E+00 |
| Mercurio (NC)             | 2.14E-06              | 9.41E-06           | 1.31E-08           | 3.50E-06           | 2.14E-02   | 9.41E-02   | 1.31E-04   | 3.50E-02   | 4.41E-08   | 9.95E-09 | 1.05E-12   | 2.20E-05  | 4.98E-06 | 1.57E-08   | 2.92E-07   | 9.72E-04   | 3.20E-01 |
| Molibdeno (NC)            | 4.63E-04              | 1.25E-03           | 2.07E-08           | 1.15E-06           | 9.26E-02   | 2.49E-01   | 4.15E-06   | 2.29E-04   | 1.17E-05   | 2.64E-07 | 2.79E-10   | 2.34E-03  | 5.28E-05 | 1.04E-07   | 4.19E-07   | 3.49E-05   | 3.47E-01 |
| Níquel (C)                | 2.05E-04              | 4.42E-03           | 2.43E-08           | 2.01E-06           | 1.71E-02   | 3.68E-01   | 2.03E-06   | 1.67E-04   | 5.19E-06   | 2.34E-06 | 1.24E-10   | 4.32E-04  | 1.95E-04 | 3.07E-05   | 6.15E-07   | 3.41E-02   | 4.26E-01 |
| Selenio (NC)              | 2.05E-05              | 5.53E-05           | 1.95E-08           | 2.26E-06           | 4.11E-03   | 1.11E-02   | 3.90E-06   | 4.52E-04   | 1.24E-06   | 2.81E-08 | 2.97E-11   | 2.49E-04  | 5.62E-06 | NA         | NA         | NA         | 4.19E-02 |
| Vanadio (NC)              | 2.14E-04              | 5.77E-04           | 3.65E-08           | 5.58E-06           | 4.25E-02   | 1.14E-01   | 7.24E-06   | 1.11E-03   | 1.08E-04   | 2.44E-05 | 2.58E-09   | 2.14E-02  | 4.84E-03 | NA         | 7.50E-08   | NA         | 2.06E-01 |
| Zinc (NC)                 | 8.16E-03              | 3.66E-02           | 1.37E-05           | 4.35E-04           | 2.72E-02   | 1.22E-01   | 4.57E-05   | 1.45E-03   | 3.24E-05   | 7.33E-06 | 7.74E-10   | 1.08E-04  | 2.44E-05 | NA         | 3.67E-07   | NA         | 1.68E-01 |



Tabla 3 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación Cancerígena   |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|------------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                        | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR - Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión              | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| Metales                  |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 1.46E-03           | NA                     | 3.69E-05              | 1.35E-05 | NA             | NA       | 2.54E-04      | 2.01E-04               | NA                            | NA       | 2.13E-03   | NA           |
| Arsénico (C)             | 3.18E-06           | 4.77E-06               | 8.08E-07              | 2.95E-07 | 1.21E-06       | 4.42E-07 | 4.20E-07      | 9.97E-08               | 2.80E-07                      | 1.50E-07 | 1.60E-05   | 2.40E-05     |
| Bario (NC)               | 3.95E-04           | NA                     | 2.28E-06              | 8.32E-07 | NA             | NA       | 2.49E-07      | 1.97E-07               | NA                            | NA       | 1.65E-04   | NA           |
| Cadmio (C)               | 1.34E-06           | NA                     | 1.62E-08              | 5.89E-09 | NA             | NA       | 1.62E-08      | 1.28E-09               | NA                            | NA       | 1.80E-06   | NA           |
| Cromo (C)                | 5.73E-06           | NA                     | 1.21E-07              | 4.42E-08 | NA             | NA       | 1.07E-06      | 8.46E-07               | NA                            | NA       | 4.36E-05   | NA           |
| Cobalto (NC)             | 3.18E-06           | NA                     | 8.08E-08              | 1.18E-08 | NA             | NA       | 4.75E-07      | 3.76E-08               | NA                            | NA       | 2.91E-06   | NA           |
| Cobre (NC)               | 7.51E-05           | NA                     | 1.33E-06              | 4.86E-07 | NA             | NA       | 3.23E-07      | 1.53E-07               | NA                            | NA       | 4.17E-05   | NA           |
| Hierro (NC)              | 2.23E-03           | NA                     | 4.24E-05              | 1.55E-05 | NA             | NA       | 1.30E-03      | 1.02E-03               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 5.09E-06           | NA                     | 8.08E-08              | 2.95E-09 | NA             | NA       | 1.62E-07      | 7.67E-09               | NA                            | NA       | 3.68E-06   | NA           |
| Manganeso (NC)           | 7.64E-04           | NA                     | 5.17E-06              | 1.88E-06 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 5.71E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                     | 1.62E-09              | 5.89E-10 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 6.71E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                     | 1.01E-06              | 3.68E-07 | NA             | NA       | 1.29E-07      | 1.02E-08               | NA                            | NA       | 2.46E-06   | NA           |
| Níquel (C)               | 7.00E-06           | NA                     | 1.62E-07              | 1.18E-08 | NA             | NA       | 2.81E-07      | 4.45E-07               | NA                            | NA       | 2.05E-05   | NA           |
| Selenio (NC)             | 8.27E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.47E-08      | 5.11E-09               | NA                            | NA       | 4.37E-05   | NA           |
| Vanadio (NC)             | 1.40E-05           | NA                     | 3.23E-07              | 1.18E-07 | NA             | NA       | 5.83E-06      | 4.61E-06               | NA                            | NA       | 1.78E-05   | NA           |
| Zinc (NC)                | 2.67E-04           | NA                     | 4.04E-07              | 8.84E-08 | NA             | NA       | 1.87E-06      | 1.48E-06               | NA                            | NA       | 1.83E-03   | NA           |

**Tabla 3**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 2.12E-03              | 5.70E-03           | 4.04E-06           | 2.12E-04           | NA           | NA           | NA           | NA           | 4.93E-03   | 1.11E-03 | 1.18E-07   | NA        | NA       | NA         | 9.99E-07   | NA         | NA         |
| Arsénico (C)             | 2.24E-06              | 6.04E-06           | 2.25E-10           | 1.89E-08           | 3.36E-06     | 9.06E-06     | 3.37E-10     | 2.83E-08     | 5.66E-07   | 3.83E-08 | 1.35E-11   | 8.49E-07  | 5.75E-08 | 9.06E-11   | 3.67E-08   | 5.50E-08   | 4.43E-05   |
| Bario (NC)               | 2.35E-03              | 4.21E-03           | 2.93E-09           | 1.13E-07           | NA           | NA           | NA           | NA           | 1.61E-05   | 3.64E-06 | 3.84E-10   | NA        | NA       | NA         | 1.25E-07   | NA         | NA         |
| Cadmio (C)               | 1.15E-05              | 3.10E-05           | 3.56E-11           | 9.84E-09           | NA           | NA           | NA           | NA           | 1.16E-07   | 2.62E-09 | 2.77E-12   | NA        | NA       | 2.23E-11   | 1.12E-07   | 2.01E-07   | 2.01E-07   |
| Cromo (C)                | 8.35E-05              | 1.06E-02           | 6.17E-08           | 4.30E-06           | NA           | NA           | NA           | NA           | 2.81E-05   | 6.35E-06 | 6.71E-10   | NA        | NA       | 1.20E-07   | 1.00E-08   | 4.00E-07   | 5.20E-07   |
| Cobalto (NC)             | 1.43E-05              | 4.61E-05           | 1.12E-08           | 2.19E-06           | NA           | NA           | NA           | NA           | 3.09E-06   | 6.97E-08 | 7.37E-11   | NA        | NA       | NA         | 5.00E-08   | NA         | NA         |
| Cobre (NC)               | 1.93E-02              | 1.02E-02           | 1.31E-06           | 1.25E-05           | NA           | NA           | NA           | NA           | 7.14E-05   | 9.68E-06 | 1.70E-09   | NA        | NA       | NA         | 1.10E-07   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.28E-02   | 2.89E-03 | 3.06E-07   | NA        | NA       | NA         | 1.28E-06   | NA         | NA         |
| Plomo (NC)               | 2.69E-06              | 5.43E-05           | 1.51E-10           | 2.52E-07           | NA           | NA           | NA           | NA           | 3.39E-06   | 4.60E-08 | 8.10E-11   | NA        | NA       | NA         | 1.68E-07   | NA         | NA         |
| Manganeso (NC)           | 7.45E-03              | 2.01E-02           | 4.99E-06           | 5.21E-05           | NA           | NA           | NA           | NA           | 2.26E-04   | 5.10E-05 | 5.38E-09   | NA        | NA       | NA         | 3.33E-09   | NA         | NA         |
| Mercurio (NC)            | 8.58E-07              | 3.76E-06           | 5.25E-09           | 1.40E-06           | NA           | NA           | NA           | NA           | 1.76E-08   | 3.98E-09 | 4.20E-13   | NA        | NA       | NA         | 1.17E-07   | NA         | NA         |
| Molibdeno (NC)           | 1.85E-04              | 4.99E-04           | 8.30E-09           | 4.58E-07           | NA           | NA           | NA           | NA           | 4.67E-06   | 1.06E-07 | 1.11E-10   | NA        | NA       | NA         | 1.68E-07   | NA         | NA         |
| Níquel (C)               | 8.22E-05              | 1.77E-03           | 9.72E-09           | 8.04E-07           | NA           | NA           | NA           | NA           | 2.07E-06   | 9.37E-07 | 4.95E-11   | NA        | NA       | 8.41E-11   | 2.46E-07   | 9.34E-08   | 9.35E-08   |
| Selenio (NC)             | 8.22E-06              | 2.21E-05           | 7.80E-09           | 9.04E-07           | NA           | NA           | NA           | NA           | 4.98E-07   | 1.12E-08 | 1.19E-11   | NA        | NA       | NA         | NA         | NA         | NA         |
| Vanadio (NC)             | 8.56E-05              | 2.31E-04           | 1.46E-08           | 2.23E-06           | NA           | NA           | NA           | NA           | 4.32E-05   | 9.77E-06 | 1.03E-09   | NA        | NA       | NA         | 3.00E-08   | NA         | NA         |
| Zinc (NC)                | 3.26E-03              | 1.46E-02           | 5.48E-06           | 1.74E-04           | NA           | NA           | NA           | NA           | 1.30E-05   | 2.93E-06 | 3.10E-10   | NA        | NA       | NA         | 1.47E-07   | NA         | NA         |

(a) Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 4      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 4.33E-02           | 4.33E-02            | 2.41E-03              | 2.90E-04 | 2.41E-03      | 2.90E-04 | 1.22E-01      | 9.81E-03               | 1.22E-01                    | 9.81E-03 | 2.88E-02   | 2.88E-02   |
| Arsénico (C)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 3.65E-07 | 1.01E-02      | 1.22E-03 | 4.85E-05      | 1.17E-06               | 1.62E-01                    | 3.89E-03 | 3.05E-05   | 1.02E-01   |
| Bario (NC)                | 1.18E-03           | 5.88E-03            | 6.53E-05              | 7.86E-06 | 3.27E-04      | 3.93E-05 | 7.14E-04      | 5.73E-05               | 3.57E-03                    | 2.86E-04 | 2.87E-03   | 1.43E-02   |
| Cadmio (C)                | 1.09E-05           | 2.18E-02            | 6.06E-07              | 7.30E-08 | 1.21E-03      | 1.46E-04 | 2.42E-06      | 1.95E-08               | 2.42E-03                    | 1.95E-05 | 2.75E-05   | 2.75E-02   |
| Cromo (C)                 | 5.45E-05           | 1.82E-02            | 3.03E-06              | 3.65E-07 | 1.01E-03      | 1.22E-04 | 2.36E-04      | 1.89E-05               | 7.85E-02                    | 6.30E-03 | 4.20E-04   | 1.40E-01   |
| Cobalto (NC)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 1.46E-07 | 1.01E-02      | 4.86E-04 | 1.31E-04      | 1.05E-06               | 4.36E-01                    | 3.50E-03 | 4.29E-05   | 1.43E-01   |
| Cobre (NC)                | 6.55E-04           | 7.27E-03            | 3.64E-05              | 4.38E-06 | 4.04E-04      | 4.86E-05 | 1.34E-03      | 6.46E-05               | 1.49E-02                    | 7.18E-04 | 4.40E-04   | 4.89E-03   |
| Hierro (NC)               | 3.13E-02           | 4.46E-02            | 1.74E-03              | 2.09E-04 | 2.48E-03      | 2.99E-04 | 3.01E-01      | 2.42E-02               | 4.31E-01                    | 3.46E-02 | NA         | NA         |
| Plomo (NC)                | 5.45E-05           | 1.52E-02            | 3.03E-06              | 3.65E-08 | 8.42E-04      | 1.01E-05 | 8.69E-05      | 4.18E-07               | 2.41E-02                    | 1.16E-04 | 1.03E-04   | 2.86E-02   |
| Manganeso (NC)            | 3.07E-03           | 5.11E-02            | 1.70E-04              | 2.05E-05 | 2.84E-03      | 3.42E-04 | 5.50E-03      | 4.41E-04               | 9.16E-02                    | 7.35E-03 | 6.91E-03   | 1.15E-01   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 6.06E-08              | 7.30E-09 | 3.03E-05      | 3.65E-06 | 1.45E-07      | 1.17E-08               | 7.27E-05                    | 5.84E-06 | 8.05E-06   | 8.05E-02   |
| Molibdeno (NC)            | 3.27E-05           | 6.55E-03            | 1.82E-06              | 2.19E-07 | 3.64E-04      | 4.38E-05 | 4.81E-05      | 3.86E-07               | 9.62E-03                    | 7.72E-05 | 3.91E-05   | 7.83E-03   |
| Níquel (C)                | 5.45E-05           | 4.55E-03            | 3.03E-06              | 7.30E-08 | 2.53E-04      | 6.08E-06 | 6.01E-05      | 9.65E-06               | 5.01E-03                    | 8.04E-04 | 2.29E-04   | 1.91E-02   |
| Selenio (NC)              | 5.45E-05           | 1.09E-02            | 3.03E-06              | 3.65E-07 | 6.06E-04      | 7.30E-05 | 9.70E-06      | 7.78E-08               | 1.94E-03                    | 1.56E-05 | 1.21E-04   | 2.43E-02   |
| Vanadio (NC)              | 1.09E-04           | 2.16E-02            | 6.06E-06              | 7.30E-07 | 1.20E-03      | 1.45E-04 | 8.04E-04      | 6.45E-05               | 1.59E-01                    | 1.28E-02 | 1.10E-04   | 2.19E-02   |
| Zinc (NC)                 | 2.73E-04           | 9.09E-04            | 1.52E-05              | 1.09E-06 | 5.05E-05      | 3.65E-06 | 7.13E-04      | 5.72E-05               | 2.38E-03                    | 1.91E-04 | 6.07E-03   | 2.02E-02   |

Tabla 4 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                       |                       |                       |                 |                 |            |            |            |          |            |           |          |            |                |            |                 |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------|-----------------|------------|------------|------------|----------|------------|-----------|----------|------------|----------------|------------|-----------------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |                 |                 |            |            | F. Suelo   |          |            |           |          |            | G. Aire        |            | IP Total        |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición<br>- Pollo | CP - Fruta      | CP - Arroz      | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposició<br>n | CP         |                 |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión       | Ingestión       | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación     | Inhalación |                 |
| Metales                   |                       |                       |                       |                       |                 |                 |            |            |            |          |            |           |          |            |                |            |                 |
| Aluminio (NC)             | 1.27E-02              | 2.60E-02              | NA                    | 4.24E-05              | 1.27E-02        | 2.60E-02        | NA         | 4.24E-05   | 2.11E-01   | 1.69E-02 | 3.71E-06   | 2.11E-01  | 1.69E-02 | 1.32E-03   | 1.93E-05       | 3.87E-03   | 4.79E-01        |
| Arsénico (C)              | 1.34E-05              | 2.76E-05              | NA                    | 3.77E-09              | 4.48E-02        | 9.19E-02        | NA         | 1.26E-05   | 2.42E-05   | 5.84E-07 | 4.25E-10   | 8.08E-02  | 1.95E-03 | NA         | 7.10E-07       | NA         | 6.80E-01        |
| Bario (NC)                | 1.41E-02              | 1.92E-02              | NA                    | 2.26E-08              | 7.05E-02        | 9.62E-02        | NA         | 1.13E-07   | 6.90E-04   | 5.54E-05 | 1.21E-08   | 3.45E-03  | 2.77E-04 | 4.30E-05   | 2.42E-06       | 4.84E-03   | 2.00E-01        |
| Cadmio (C)                | 6.90E-05              | 1.42E-04              | NA                    | 1.97E-09              | 6.90E-02        | 1.42E-01        | NA         | 1.97E-06   | 4.98E-06   | 4.00E-08 | 8.74E-11   | 4.98E-03  | 4.00E-05 | NA         | 2.16E-06       | NA         | 2.69E-01        |
| Cromo (C)                 | 5.01E-04              | 4.84E-02              | NA                    | 8.59E-07              | 1.67E-01        | <b>1.61E+01</b> | NA         | 2.86E-04   | 1.20E-03   | 9.67E-05 | 2.11E-08   | 4.02E-01  | 3.22E-02 | 3.75E-04   | 1.94E-07       | 1.94E-03   | <b>1.70E+01</b> |
| Cobalto (NC)              | 8.56E-05              | 2.11E-04              | NA                    | 4.38E-07              | 2.85E-01        | 7.02E-01        | NA         | 1.46E-03   | 1.32E-04   | 1.06E-06 | 2.32E-09   | 4.41E-01  | 3.54E-03 | 6.87E-04   | 9.68E-07       | 1.61E-01   | <b>2.37E+00</b> |
| Cobre (NC)                | 1.16E-01              | 4.64E-02              | NA                    | 2.50E-06              | <b>1.29E+00</b> | 5.16E-01        | NA         | 2.78E-05   | 3.06E-03   | 1.47E-04 | 5.37E-08   | 3.40E-02  | 1.64E-03 | 9.53E-05   | 2.13E-06       | 2.13E-03   | <b>1.87E+00</b> |
| Hierro (NC)               | 5.07E-02              | 1.04E-01              | NA                    | 4.48E-06              | 7.25E-02        | 1.49E-01        | NA         | 6.40E-06   | 5.49E-01   | 4.40E-02 | 9.63E-06   | 7.84E-01  | 6.29E-02 | NA         | 2.49E-05       | NA         | <b>1.36E+00</b> |
| Plomo (NC)                | 1.61E-05              | 2.48E-04              | NA                    | 5.02E-08              | 4.48E-03        | 6.89E-02        | NA         | 1.40E-05   | 1.45E-04   | 7.00E-07 | 2.55E-09   | 4.04E-02  | 1.95E-04 | NA         | 3.25E-06       | NA         | <b>1.83E-01</b> |
| Manganeso (NC)            | 4.47E-02              | 9.16E-02              | NA                    | 1.04E-05              | 7.45E-01        | <b>1.53E+00</b> | NA         | 1.73E-04   | 9.67E-03   | 7.76E-04 | 1.70E-07   | 1.61E-01  | 1.29E-02 | 6.02E-03   | 6.45E-08       | 1.29E-03   | <b>2.72E+00</b> |
| Mercurio (NC)             | 5.15E-06              | 1.72E-05              | NA                    | 2.79E-07              | 5.15E-02        | 1.72E-01        | NA         | 2.79E-03   | 7.55E-07   | 6.06E-08 | 1.33E-11   | 3.78E-04  | 3.03E-05 | 7.84E-08   | 2.26E-06       | 7.53E-03   | 3.15E-01        |
| Molibdeno (NC)            | 1.11E-03              | 2.28E-03              | NA                    | 9.15E-08              | 2.22E-01        | 4.56E-01        | NA         | 1.83E-05   | 2.00E-04   | 1.61E-06 | 3.51E-09   | 4.01E-02  | 3.21E-04 | 5.20E-07   | 3.24E-06       | 2.70E-04   | 7.43E-01        |
| Níquel (C)                | 4.93E-04              | 8.07E-03              | NA                    | 1.60E-07              | 4.11E-02        | 6.72E-01        | NA         | 1.34E-05   | 8.89E-05   | 1.43E-05 | 1.56E-09   | 7.41E-03  | 1.19E-03 | 1.54E-04   | 4.76E-06       | 2.64E-01   | <b>1.02E+00</b> |
| Selenio (NC)              | 4.93E-05              | 1.01E-04              | NA                    | 1.81E-07              | 9.86E-03        | 2.02E-02        | NA         | 3.61E-05   | 2.13E-05   | 1.71E-07 | 3.74E-10   | 4.27E-03  | 3.42E-05 | NA         | 1.94E-07       | NA         | 7.23E-02        |
| Vanadio (NC)              | 5.14E-04              | 1.05E-03              | NA                    | 4.46E-07              | 1.02E-01        | 2.09E-01        | NA         | 8.85E-05   | 1.85E-03   | 1.49E-04 | 3.25E-08   | 3.68E-01  | 2.95E-02 | NA         | 5.81E-07       | NA         | 9.25E-01        |
| Zinc (NC)                 | 1.96E-02              | 6.68E-02              | NA                    | 3.47E-05              | 6.53E-02        | 2.23E-01        | NA         | 1.16E-04   | 5.56E-04   | 4.46E-05 | 9.76E-09   | 1.85E-03  | 1.49E-04 | NA         | 2.84E-06       | NA         | 3.14E-01        |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Nota: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 5      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.53E-02           | 2.53E-02            | 5.62E-04              | 2.05E-04 | 5.62E-04      | 2.05E-04 | 7.13E-03      | 5.64E-03               | 7.13E-03                    | 5.64E-03 | 2.88E-02   | 2.88E-02   |
| Arsénico (C)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 2.58E-07 | 2.36E-03      | 8.59E-04 | 2.83E-06      | 6.71E-07               | 9.43E-03                    | 2.24E-03 | 3.05E-05   | 1.02E-01   |
| Bario (NC)                | 6.86E-04           | 3.43E-03            | 1.52E-05              | 5.55E-06 | 7.62E-05      | 2.78E-05 | 4.16E-05      | 3.29E-05               | 2.08E-04                    | 1.65E-04 | 2.87E-03   | 1.43E-02   |
| Cadmio (C)                | 6.36E-06           | 1.27E-02            | 1.41E-07              | 5.15E-08 | 2.83E-04      | 1.03E-04 | 1.41E-07      | 1.12E-08               | 1.41E-04                    | 1.12E-05 | 2.75E-05   | 2.75E-02   |
| Cromo (C)                 | 3.18E-05           | 1.06E-02            | 7.07E-07              | 2.58E-07 | 2.36E-04      | 8.59E-05 | 1.37E-05      | 1.09E-05               | 4.58E-03                    | 3.62E-03 | 4.20E-04   | 1.40E-01   |
| Cobalto (NC)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 1.03E-07 | 2.36E-03      | 3.44E-04 | 7.64E-06      | 6.04E-07               | 2.55E-02                    | 2.01E-03 | 4.29E-05   | 1.43E-01   |
| Cobre (NC)                | 3.82E-04           | 3.82E-03            | 8.49E-06              | 3.09E-06 | 8.49E-05      | 3.09E-05 | 7.83E-05      | 3.71E-05               | 7.83E-04                    | 3.71E-04 | 4.40E-04   | 4.40E-03   |
| Hierro (NC)               | 1.82E-02           | 2.61E-02            | 4.05E-04              | 1.48E-04 | 5.79E-04      | 2.11E-04 | 1.76E-02      | 1.39E-02               | 2.51E-02                    | 1.99E-02 | NA         | NA         |
| Plomo (NC)                | 3.18E-05           | 8.84E-03            | 7.07E-07              | 2.58E-08 | 1.96E-04      | 7.16E-06 | 5.07E-06      | 2.40E-07               | 1.41E-03                    | 6.68E-05 | 1.03E-04   | 2.86E-02   |
| Manganeso (NC)            | 1.79E-03           | 2.98E-02            | 3.97E-05              | 1.45E-05 | 6.62E-04      | 2.41E-04 | 3.21E-04      | 2.54E-04               | 5.35E-03                    | 4.23E-03 | 6.91E-03   | 1.15E-01   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.41E-08              | 5.15E-09 | 7.07E-06      | 2.58E-06 | 8.49E-09      | 6.71E-09               | 4.24E-06                    | 3.35E-06 | 8.05E-06   | 8.05E-02   |
| Molibdeno (NC)            | 1.91E-05           | 3.82E-03            | 4.24E-07              | 1.55E-07 | 8.49E-05      | 3.09E-05 | 2.81E-06      | 2.22E-07               | 5.61E-04                    | 4.44E-05 | 3.91E-05   | 7.83E-03   |
| Níquel (C)                | 3.18E-05           | 2.65E-03            | 7.07E-07              | 5.15E-08 | 5.89E-05      | 4.30E-06 | 3.51E-06      | 5.55E-06               | 2.92E-04                    | 4.62E-04 | 2.29E-04   | 1.91E-02   |
| Selenio (NC)              | 3.18E-05           | 6.36E-03            | 7.07E-07              | 2.58E-07 | 1.41E-04      | 5.15E-05 | 5.66E-07      | 4.47E-08               | 1.13E-04                    | 8.94E-06 | 1.21E-04   | 2.43E-02   |
| Vanadio (NC)              | 6.36E-05           | 1.26E-02            | 1.41E-06              | 5.15E-07 | 2.81E-04      | 1.02E-04 | 4.69E-05      | 3.71E-05               | 9.31E-03                    | 7.36E-03 | 1.10E-04   | 2.19E-02   |
| Zinc (NC)                 | 1.59E-04           | 5.30E-04            | 3.54E-06              | 7.73E-07 | 1.18E-05      | 2.58E-06 | 4.16E-05      | 3.29E-05               | 1.39E-04                    | 1.10E-04 | 6.07E-03   | 2.02E-02   |

**Tabla 5      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.27E-02              | 2.60E-02           | NA                 | 4.24E-05           | 1.27E-02   | 2.60E-02   | NA         | 4.24E-05   | 1.23E-02   | 9.74E-03 | 1.47E-06   | 1.23E-02  | 9.74E-03 | 1.32E-03   | 1.93E-05   | 3.87E-03   | 1.34E-01 |
| Arsénico (C)              | 1.34E-05              | 2.76E-05           | NA                 | 3.77E-09           | 4.48E-02   | 9.19E-02   | NA         | 1.26E-05   | 1.41E-06   | 3.35E-07 | 1.69E-10   | 4.71E-03  | 1.12E-03 | NA         | 7.10E-07   | NA         | 3.65E-01 |
| Bario (NC)                | 1.41E-02              | 1.92E-02           | NA                 | 2.26E-08           | 7.05E-02   | 9.62E-02   | NA         | 1.13E-07   | 4.03E-05   | 3.18E-05 | 4.80E-09   | 2.01E-04  | 1.59E-04 | 4.30E-05   | 2.42E-06   | 4.84E-03   | 1.90E-01 |
| Cadmio (C)                | 6.90E-05              | 1.42E-04           | NA                 | 1.97E-09           | 6.90E-02   | 1.42E-01   | NA         | 1.97E-06   | 2.91E-07   | 2.30E-08 | 3.46E-11   | 2.91E-04  | 2.30E-05 | NA         | 2.16E-06   | NA         | 2.52E-01 |
| Cromo (C)                 | 5.01E-04              | 4.84E-02           | NA                 | 8.59E-07           | 1.67E-01   | 1.61E+01   | NA         | 2.86E-04   | 7.03E-05   | 5.56E-05 | 8.38E-09   | 2.34E-02  | 1.85E-02 | 3.75E-04   | 1.94E-07   | 1.94E-03   | 1.65E+01 |
| Cobalto (NC)              | 8.56E-05              | 2.11E-04           | NA                 | 4.38E-07           | 2.85E-01   | 7.02E-01   | NA         | 1.46E-03   | 7.72E-06   | 6.10E-07 | 9.21E-10   | 2.57E-02  | 2.03E-03 | 6.87E-04   | 9.68E-07   | 1.61E-01   | 1.46E+00 |
| Cobre (NC)                | 1.16E-01              | 4.64E-02           | NA                 | 2.50E-06           | 1.16E+00   | 4.64E-01   | NA         | 2.50E-05   | 1.79E-04   | 8.47E-05 | 2.13E-08   | 1.79E-03  | 8.47E-04 | 9.53E-05   | 2.13E-06   | 2.13E-03   | 1.64E+00 |
| Hierro (NC)               | 5.07E-02              | 1.04E-01           | NA                 | 4.48E-06           | 7.25E-02   | 1.49E-01   | NA         | 6.40E-06   | 3.20E-02   | 2.53E-02 | 3.82E-06   | 4.57E-02  | 3.62E-02 | NA         | 2.49E-05   | NA         | 1.54E-01 |
| Plomo (NC)                | 1.61E-05              | 2.48E-04           | NA                 | 5.02E-08           | 4.48E-03   | 6.89E-02   | NA         | 1.40E-05   | 8.49E-06   | 4.03E-07 | 1.01E-09   | 2.36E-03  | 1.12E-04 | NA         | 3.25E-06   | NA         | 1.15E-01 |
| Manganeso (NC)            | 4.47E-02              | 9.16E-02           | NA                 | 1.04E-05           | 7.45E-01   | 1.53E+00   | NA         | 1.73E-04   | 5.64E-04   | 4.46E-04 | 6.73E-08   | 9.40E-03  | 7.43E-03 | 6.02E-03   | 6.45E-08   | 1.29E-03   | 2.45E+00 |
| Mercurio (NC)             | 5.15E-06              | 1.72E-05           | NA                 | 2.79E-07           | 5.15E-02   | 1.72E-01   | NA         | 2.79E-03   | 4.41E-08   | 3.48E-08 | 5.26E-12   | 2.20E-05  | 1.74E-05 | 7.84E-08   | 2.26E-06   | 7.53E-03   | 3.14E-01 |
| Molibdeno (NC)            | 1.11E-03              | 2.28E-03           | NA                 | 9.15E-08           | 2.22E-01   | 4.56E-01   | NA         | 1.83E-05   | 1.17E-05   | 9.24E-07 | 1.39E-09   | 2.34E-03  | 1.85E-04 | 5.20E-07   | 3.24E-06   | 2.70E-04   | 6.93E-01 |
| Níquel (C)                | 4.93E-04              | 8.07E-03           | NA                 | 1.60E-07           | 4.11E-02   | 6.72E-01   | NA         | 1.34E-05   | 5.19E-06   | 8.20E-06 | 6.18E-10   | 4.32E-04  | 6.83E-04 | 1.54E-04   | 4.76E-06   | 2.64E-01   | 1.00E+00 |
| Selenio (NC)              | 4.93E-05              | 1.01E-04           | NA                 | 1.81E-07           | 9.86E-03   | 2.02E-02   | NA         | 3.61E-05   | 1.24E-06   | 9.84E-08 | 1.48E-10   | 2.49E-04  | 1.97E-05 | NA         | NA         | NA         | 6.14E-02 |
| Vanadio (NC)              | 5.14E-04              | 1.05E-03           | NA                 | 4.46E-07           | 1.02E-01   | 2.09E-01   | NA         | 8.85E-05   | 1.08E-04   | 8.54E-05 | 1.29E-08   | 2.14E-02  | 1.70E-02 | NA         | 5.81E-07   | NA         | 4.01E-01 |
| Zinc (NC)                 | 1.96E-02              | 6.68E-02           | NA                 | 3.47E-05           | 6.53E-02   | 2.23E-01   | NA         | 1.16E-04   | 3.24E-05   | 2.56E-05 | 3.87E-09   | 1.08E-04  | 8.55E-05 | NA         | 2.84E-06   | NA         | 3.09E-01 |

**Tabla 5      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 1.46E-03           | NA                    | 2.25E-04              | 8.18E-05 | NA             | NA       | 2.85E-03      | 2.25E-03               | NA                            | NA       | 1.15E-02   | NA           |
| Arsénico (C)             | 3.18E-06           | 4.77E-06              | 2.83E-07              | 1.03E-07 | 4.24E-07       | 1.55E-07 | 1.13E-06      | 2.68E-07               | 1.70E-06                      | 4.03E-07 | 1.22E-05   | 1.83E-05     |
| Bario (NC)               | 3.95E-04           | NA                    | 6.10E-06              | 2.22E-06 | NA             | NA       | 1.67E-05      | 1.32E-05               | NA                            | NA       | 1.15E-03   | NA           |
| Cadmio (C)               | 1.34E-06           | NA                    | 5.66E-08              | 2.06E-08 | NA             | NA       | 5.66E-08      | 4.47E-09               | NA                            | NA       | 1.10E-05   | NA           |
| Cromo (C)                | 5.73E-06           | NA                    | 2.83E-07              | 1.03E-07 | NA             | NA       | 5.50E-06      | 4.35E-06               | NA                            | NA       | 1.68E-04   | NA           |
| Cobalto (NC)             | 3.18E-06           | NA                    | 2.83E-07              | 4.12E-08 | NA             | NA       | 3.06E-06      | 2.42E-07               | NA                            | NA       | 1.72E-05   | NA           |
| Cobre (NC)               | 7.51E-05           | NA                    | 3.39E-06              | 1.24E-06 | NA             | NA       | 3.13E-05      | 1.49E-05               | NA                            | NA       | 1.76E-04   | NA           |
| Hierro (NC)              | 2.23E-03           | NA                    | 1.62E-04              | 5.91E-05 | NA             | NA       | 7.04E-03      | 5.56E-03               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 5.09E-06           | NA                    | 2.83E-07              | 1.03E-08 | NA             | NA       | 2.03E-06      | 9.62E-08               | NA                            | NA       | 4.12E-05   | NA           |
| Manganeso (NC)           | 7.64E-04           | NA                    | 1.59E-05              | 5.79E-06 | NA             | NA       | 1.28E-04      | 1.01E-04               | NA                            | NA       | 2.76E-03   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 5.66E-09              | 2.06E-09 | NA             | NA       | 3.39E-09      | 2.68E-09               | NA                            | NA       | 3.22E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 1.70E-07              | 6.19E-08 | NA             | NA       | 1.12E-06      | 8.87E-08               | NA                            | NA       | 1.57E-05   | NA           |
| Níquel (C)               | 7.00E-06           | NA                    | 2.83E-07              | 2.06E-08 | NA             | NA       | 1.40E-06      | 2.22E-06               | NA                            | NA       | 9.14E-05   | NA           |
| Selenio (NC)             | 8.27E-06           | NA                    | 2.83E-07              | 1.03E-07 | NA             | NA       | 2.26E-07      | 1.79E-08               | NA                            | NA       | 4.86E-05   | NA           |
| Vanadio (NC)             | 1.40E-05           | NA                    | 5.66E-07              | 2.06E-07 | NA             | NA       | 1.88E-05      | 1.48E-05               | NA                            | NA       | 4.41E-05   | NA           |
| Zinc (NC)                | 2.67E-04           | NA                    | 1.41E-06              | 3.09E-07 | NA             | NA       | 1.66E-05      | 1.31E-05               | NA                            | NA       | 2.43E-03   | NA           |

**Tabla 5      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del pAís |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 5.08E-03              | 1.04E-02           | NA                 | 1.70E-05           | NA           | NA           | NA           | NA           | 4.93E-03   | 3.90E-03 | 5.88E-07   | NA        | NA       | NA         | 7.74E-06   | NA         | NA         |
| Arsénico (C)             | 5.38E-06              | 1.10E-05           | NA                 | 1.51E-09           | 8.07E-06     | 1.65E-05     | NA           | 2.26E-09     | 5.66E-07   | 1.34E-07 | 6.75E-11   | 8.49E-07  | 2.01E-07 | 4.53E-10   | 2.84E-07   | 4.26E-07   | 5.18E-05   |
| Bario (NC)               | 5.64E-03              | 7.70E-03           | NA                 | 9.05E-09           | NA           | NA           | NA           | NA           | 1.61E-05   | 1.27E-05 | 1.92E-09   | NA        | NA       | NA         | 9.68E-07   | NA         | NA         |
| Cadmio (C)               | 2.76E-05              | 5.66E-05           | NA                 | 7.86E-10           | NA           | NA           | NA           | NA           | 1.16E-07   | 9.19E-09 | 1.39E-11   | NA        | NA       | 1.12E-10   | 8.65E-07   | 1.56E-06   | 1.56E-06   |
| Cromo (C)                | 2.00E-04              | 1.94E-02           | NA                 | 3.43E-07           | NA           | NA           | NA           | NA           | 2.81E-05   | 2.22E-05 | 3.35E-09   | NA        | NA       | 6.00E-07   | 7.74E-08   | 3.10E-06   | 3.70E-06   |
| Cobalto (NC)             | 3.42E-05              | 8.43E-05           | NA                 | 1.75E-07           | NA           | NA           | NA           | NA           | 3.09E-06   | 2.44E-07 | 3.68E-10   | NA        | NA       | NA         | 3.87E-07   | NA         | NA         |
| Cobre (NC)               | 4.63E-02              | 1.86E-02           | NA                 | 9.99E-07           | NA           | NA           | NA           | NA           | 7.14E-05   | 3.39E-05 | 8.52E-09   | NA        | NA       | NA         | 8.52E-07   | NA         | NA         |
| Hierro (NC)              | 2.03E-02              | 4.16E-02           | NA                 | 1.79E-06           | NA           | NA           | NA           | NA           | 1.28E-02   | 1.01E-02 | 1.53E-06   | NA        | NA       | NA         | 9.94E-06   | NA         | NA         |
| Plomo (NC)               | 6.45E-06              | 9.93E-05           | NA                 | 2.01E-08           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.61E-07 | 4.05E-10   | NA        | NA       | NA         | 1.30E-06   | NA         | NA         |
| Manganeso (NC)           | 1.79E-02              | 3.67E-02           | NA                 | 4.16E-06           | NA           | NA           | NA           | NA           | 2.26E-04   | 1.78E-04 | 2.69E-08   | NA        | NA       | NA         | 2.58E-08   | NA         | NA         |
| Mercurio (NC)            | 2.06E-06              | 6.87E-06           | NA                 | 1.12E-07           | NA           | NA           | NA           | NA           | 1.76E-08   | 1.39E-08 | 2.10E-12   | NA        | NA       | NA         | 9.03E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.44E-04              | 9.11E-04           | NA                 | 3.66E-08           | NA           | NA           | NA           | NA           | 4.67E-06   | 3.70E-07 | 5.57E-10   | NA        | NA       | NA         | 1.30E-06   | NA         | NA         |
| Níquel (C)               | 1.97E-04              | 3.23E-03           | NA                 | 6.42E-08           | NA           | NA           | NA           | NA           | 2.07E-06   | 3.28E-06 | 2.47E-10   | NA        | NA       | 4.21E-10   | 1.90E-06   | 7.23E-07   | 7.24E-07   |
| Selenio (NC)             | 1.97E-05              | 4.04E-05           | NA                 | 7.22E-08           | NA           | NA           | NA           | NA           | 4.98E-07   | 3.94E-08 | 5.94E-11   | NA        | NA       | NA         | 7.74E-08   | NA         | NA         |
| Vanadio (NC)             | 2.06E-04              | 4.21E-04           | NA                 | 1.78E-07           | NA           | NA           | NA           | NA           | 4.32E-05   | 3.42E-05 | 5.16E-09   | NA        | NA       | NA         | 2.32E-07   | NA         | NA         |
| Zinc (NC)                | 7.83E-03              | 2.67E-02           | NA                 | 1.39E-05           | NA           | NA           | NA           | NA           | 1.30E-05   | 1.03E-05 | 1.55E-09   | NA        | NA       | NA         | 1.14E-06   | NA         | NA         |

<sup>(a)</sup>      Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:    Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

          Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



**Tabla 6      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá  
- Estimaciones de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 6.27E-03           | 6.27E-03            | 1.72E-03              | 2.07E-04 | 1.72E-03      | 2.07E-04 | 8.73E-02      | 7.00E-03               | 8.73E-02                    | 7.00E-03 | 4.17E-03   | 4.17E-03   |
| Arsénico (C)              | 1.36E-05           | 4.55E-02            | 2.16E-06              | 2.61E-07 | 7.22E-03      | 8.69E-04 | 3.46E-05      | 8.34E-07               | 1.15E-01                    | 2.78E-03 | 4.41E-06   | 1.47E-02   |
| Bario (NC)                | 1.69E-03           | 8.45E-03            | 4.66E-05              | 5.62E-06 | 2.33E-04      | 2.81E-05 | 5.10E-04      | 4.09E-05               | 2.55E-03                    | 2.05E-04 | 4.14E-04   | 2.07E-03   |
| Cadmio (C)                | 5.73E-06           | 1.15E-02            | 4.33E-07              | 5.21E-08 | 8.66E-04      | 1.04E-04 | 1.73E-06      | 1.39E-08               | 1.73E-03                    | 1.39E-05 | 3.97E-06   | 3.97E-03   |
| Cromo (C)                 | 2.45E-05           | 8.18E-03            | 2.16E-06              | 2.61E-07 | 7.22E-04      | 8.69E-05 | 1.68E-04      | 1.35E-05               | 5.61E-02                    | 4.50E-03 | 6.06E-05   | 2.02E-02   |
| Cobalto (NC)              | 1.36E-05           | 4.55E-02            | 2.16E-06              | 1.04E-07 | 7.22E-03      | 3.47E-04 | 9.35E-05      | 7.50E-07               | 3.12E-01                    | 2.50E-03 | 6.19E-06   | 2.06E-02   |
| Cobre (NC)                | 3.22E-04           | 3.58E-03            | 2.60E-05              | 3.13E-06 | 2.89E-04      | 3.47E-05 | 9.59E-04      | 4.62E-05               | 1.07E-02                    | 5.13E-04 | 6.36E-05   | 7.06E-04   |
| Hierro (NC)               | 9.55E-03           | 1.36E-02            | 1.24E-03              | 1.49E-04 | 1.77E-03      | 2.13E-04 | 2.15E-01      | 1.73E-02               | 3.08E-01                    | 2.47E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 2.18E-05           | 6.06E-03            | 2.16E-06              | 2.61E-08 | 6.01E-04      | 7.24E-06 | 6.21E-05      | 2.99E-07               | 1.72E-02                    | 8.30E-05 | 1.49E-05   | 4.14E-03   |
| Manganeso (NC)            | 3.27E-03           | 5.45E-02            | 1.22E-04              | 1.46E-05 | 2.03E-03      | 2.44E-04 | 3.93E-03      | 3.15E-04               | 6.55E-02                    | 5.25E-03 | 9.98E-04   | 1.66E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 4.33E-08              | 5.21E-09 | 2.16E-05      | 2.61E-06 | 1.04E-07      | 8.34E-09               | 5.19E-05                    | 4.17E-06 | 1.16E-06   | 1.16E-02   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 1.30E-06              | 1.56E-07 | 2.60E-04      | 3.13E-05 | 3.44E-05      | 2.76E-07               | 6.87E-03                    | 5.51E-05 | 5.65E-06   | 1.13E-03   |
| Níquel (C)                | 3.00E-05           | 2.50E-03            | 2.16E-06              | 5.21E-08 | 1.80E-04      | 4.34E-06 | 4.29E-05      | 6.89E-06               | 3.58E-03                    | 5.74E-04 | 3.30E-05   | 2.75E-03   |
| Talio (NC)                | 3.55E-05           | 7.09E-03            | 2.16E-06              | 2.61E-07 | 4.33E-04      | 5.21E-05 | 6.93E-06      | 5.56E-08               | 1.39E-03                    | 1.11E-05 | 1.75E-05   | 3.51E-03   |
| Vanadio (NC)              | 6.00E-05           | 1.19E-02            | 4.33E-06              | 5.21E-07 | 8.59E-04      | 1.03E-04 | 5.74E-04      | 4.61E-05               | 1.14E-01                    | 9.14E-03 | 1.59E-05   | 3.16E-03   |
| Zinc (NC)                 | 1.15E-03           | 3.82E-03            | 1.08E-05              | 7.82E-07 | 3.61E-05      | 2.61E-06 | 5.09E-04      | 4.09E-05               | 1.70E-03                    | 1.36E-04 | 8.76E-04   | 2.92E-03   |

**Tabla 6      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimaciones de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición<br>- Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.29E-02              | 2.37E-02              | NA                    | 1.59E-04              | 1.29E-02   | 2.37E-02   | NA         | 1.59E-04   | 2.11E-01   | 1.21E-02 | 3.71E-06   | 2.11E-01  | 1.21E-02 | 1.32E-03   | 3.77E-05   | 7.55E-03   | 3.76E-01 |
| Arsénico (C)              | 1.36E-05              | 2.52E-05              | NA                    | 1.41E-08              | 4.54E-02   | 8.39E-02   | NA         | 4.70E-05   | 2.42E-05   | 4.17E-07 | 4.25E-10   | 8.08E-02  | 1.39E-03 | NA         | 1.39E-06   | NA         | 3.98E-01 |
| Bario (NC)                | 1.43E-02              | 1.76E-02              | NA                    | 8.47E-08              | 7.15E-02   | 8.78E-02   | NA         | 4.24E-07   | 6.90E-04   | 3.96E-05 | 1.21E-08   | 3.45E-03  | 1.98E-04 | 4.30E-05   | 4.72E-06   | 9.44E-03   | 1.86E-01 |
| Cadmio (C)                | 7.00E-05              | 1.29E-04              | NA                    | 7.36E-09              | 7.00E-02   | 1.29E-01   | NA         | 7.36E-06   | 4.98E-06   | 2.85E-08 | 8.74E-11   | 4.98E-03  | 2.85E-05 | NA         | 4.22E-06   | NA         | 2.22E-01 |
| Cromo (C)                 | 5.08E-04              | 4.42E-02              | NA                    | 3.21E-06              | 1.69E-01   | 1.47E+01   | NA         | 1.07E-03   | 1.20E-03   | 6.91E-05 | 2.11E-08   | 4.02E-01  | 2.30E-02 | 3.75E-04   | 3.78E-07   | 3.78E-03   | 1.54E+01 |
| Cobalto (NC)              | 8.68E-05              | 1.92E-04              | NA                    | 1.64E-06              | 2.89E-01   | 6.41E-01   | NA         | 5.46E-03   | 1.32E-04   | 7.58E-07 | 2.32E-09   | 4.41E-01  | 2.53E-03 | 6.87E-04   | 1.89E-06   | 3.15E-01   | 2.08E+00 |
| Cobre (NC)                | 1.17E-01              | 4.24E-02              | NA                    | 9.35E-06              | 1.30E+00   | 4.71E-01   | NA         | 1.04E-04   | 3.06E-03   | 1.05E-04 | 5.37E-08   | 3.40E-02  | 1.17E-03 | 9.53E-05   | 4.16E-06   | 4.16E-03   | 1.83E+00 |
| Hierro (NC)               | 5.14E-02              | 9.49E-02              | NA                    | 1.68E-05              | 7.35E-02   | 1.36E-01   | NA         | 2.40E-05   | 5.49E-01   | 3.15E-02 | 9.63E-06   | 7.84E-01  | 4.49E-02 | #DIV/0!    | 4.85E-05   | NA         | 1.18E+00 |
| Plomo (NC)                | 1.64E-05              | 2.26E-04              | NA                    | 1.88E-07              | 4.54E-03   | 6.29E-02   | NA         | 5.22E-05   | 1.45E-04   | 5.00E-07 | 2.55E-09   | 4.04E-02  | 1.39E-04 | NA         | 6.34E-06   | NA         | 1.36E-01 |
| Manganeso (NC)            | 4.53E-02              | 8.36E-02              | NA                    | 3.89E-05              | 7.55E-01   | 1.39E+00   | NA         | 6.49E-04   | 9.67E-03   | 5.54E-04 | 1.70E-07   | 1.61E-01  | 9.24E-03 | 6.02E-03   | 1.26E-07   | 2.52E-03   | 2.47E+00 |
| Mercurio (NC)             | 5.22E-06              | 1.57E-05              | NA                    | 1.05E-06              | 5.22E-02   | 1.57E-01   | NA         | 1.05E-02   | 7.55E-07   | 4.33E-08 | 1.33E-11   | 3.78E-04  | 2.17E-05 | 7.84E-08   | 4.41E-06   | 1.47E-02   | 2.47E-01 |
| Molibdeno (NC)            | 1.13E-03              | 2.08E-03              | NA                    | 3.42E-07              | 2.25E-01   | 4.16E-01   | NA         | 6.85E-05   | 2.00E-04   | 1.15E-06 | 3.51E-09   | 4.01E-02  | 2.30E-04 | 5.20E-07   | 6.33E-06   | 5.27E-04   | 6.91E-01 |
| Níquel (C)                | 5.00E-04              | 7.36E-03              | NA                    | 6.01E-07              | 4.16E-02   | 6.14E-01   | NA         | 5.01E-05   | 8.89E-05   | 1.02E-05 | 1.56E-09   | 7.41E-03  | 8.49E-04 | 1.54E-04   | 9.29E-06   | 5.16E-01   | 1.19E+00 |
| Talio (NC)                | 5.00E-05              | 9.22E-05              | NA                    | 6.76E-07              | 1.00E-02   | 1.84E-02   | NA         | 1.35E-04   | 2.13E-05   | 1.22E-07 | 3.74E-10   | 4.27E-03  | 2.45E-05 | NA         | 3.78E-07   | NA         | 4.40E-02 |
| Vanadio (NC)              | 5.21E-04              | 9.61E-04              | NA                    | 1.67E-06              | 1.03E-01   | 1.91E-01   | NA         | 3.31E-04   | 1.85E-03   | 1.06E-04 | 3.25E-08   | 3.68E-01  | 2.11E-02 | NA         | 1.13E-06   | NA         | 8.22E-01 |
| Zinc (NC)                 | 1.99E-02              | 6.10E-02              | NA                    | 1.30E-04              | 6.62E-02   | 2.03E-01   | NA         | 4.33E-04   | 5.56E-04   | 3.19E-05 | 9.76E-09   | 1.85E-03  | 1.06E-04 | NA         | 5.54E-06   | NA         | 2.80E-01 |

<sup>(a)</sup>      Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:    Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 7      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.66E-03           | 3.66E-03            | 4.01E-04              | 1.46E-04 | 4.01E-04      | 1.46E-04 | 5.09E-03      | 4.03E-03               | 5.09E-03                    | 4.03E-03 | 4.17E-03   | 4.17E-03   |
| Arsénico (C)              | 7.96E-06           | 2.65E-02            | 5.05E-07              | 1.84E-07 | 1.68E-03      | 6.14E-04 | 2.02E-06      | 4.79E-07               | 6.74E-03                    | 1.60E-03 | 4.41E-06   | 1.47E-02   |
| Bario (NC)                | 9.87E-04           | 4.93E-03            | 1.09E-05              | 3.97E-06 | 5.44E-05      | 1.98E-05 | 2.97E-05      | 2.35E-05               | 1.49E-04                    | 1.18E-04 | 4.14E-04   | 2.07E-03   |
| Cadmio (C)                | 3.34E-06           | 6.68E-03            | 1.01E-07              | 3.68E-08 | 2.02E-04      | 7.36E-05 | 1.01E-07      | 7.99E-09               | 1.01E-04                    | 7.99E-06 | 3.97E-06   | 3.97E-03   |
| Cromo (C)                 | 1.43E-05           | 4.77E-03            | 5.05E-07              | 1.84E-07 | 1.68E-04      | 6.14E-05 | 9.82E-06      | 7.76E-06               | 3.27E-03                    | 2.59E-03 | 6.06E-05   | 2.02E-02   |
| Cobalto (NC)              | 7.96E-06           | 2.65E-02            | 5.05E-07              | 7.36E-08 | 1.68E-03      | 2.45E-04 | 5.46E-06      | 4.31E-07               | 1.82E-02                    | 1.44E-03 | 6.19E-06   | 2.06E-02   |
| Cobre (NC)                | 1.88E-04           | 1.88E-03            | 6.06E-06              | 2.21E-06 | 6.06E-05      | 2.21E-05 | 5.59E-05      | 2.65E-05               | 5.59E-04                    | 2.65E-04 | 6.36E-05   | 6.36E-04   |
| Hierro (NC)               | 5.57E-03           | 7.96E-03            | 2.89E-04              | 1.05E-04 | 4.14E-04      | 1.51E-04 | 1.26E-02      | 9.93E-03               | 1.79E-02                    | 1.42E-02 | NA         | NA         |
| Plomo (NC)                | 1.27E-05           | 3.54E-03            | 5.05E-07              | 1.84E-08 | 1.40E-04      | 5.11E-06 | 3.62E-06      | 1.72E-07               | 1.01E-03                    | 4.77E-05 | 1.49E-05   | 4.14E-03   |
| Manganeso (NC)            | 1.91E-03           | 3.18E-02            | 2.84E-05              | 1.03E-05 | 4.73E-04      | 1.72E-04 | 2.29E-04      | 1.81E-04               | 3.82E-03                    | 3.02E-03 | 9.98E-04   | 1.66E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.01E-08              | 3.68E-09 | 5.05E-06      | 1.84E-06 | 6.06E-09      | 4.79E-09               | 3.03E-06                    | 2.40E-06 | 1.16E-06   | 1.16E-02   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 3.03E-07              | 1.10E-07 | 6.06E-05      | 2.21E-05 | 2.00E-06      | 1.58E-07               | 4.01E-04                    | 3.17E-05 | 5.65E-06   | 1.13E-03   |
| Níquel (C)                | 1.75E-05           | 1.46E-03            | 5.05E-07              | 3.68E-08 | 4.21E-05      | 3.07E-06 | 2.51E-06      | 3.96E-06               | 2.09E-04                    | 3.30E-04 | 3.30E-05   | 2.75E-03   |
| Selenio (NC)              | 2.07E-05           | 4.14E-03            | 5.05E-07              | 1.84E-07 | 1.01E-04      | 3.68E-05 | 4.04E-07      | 3.19E-08               | 8.08E-05                    | 6.39E-06 | 1.75E-05   | 3.51E-03   |
| Vanadio (NC)              | 3.50E-05           | 6.95E-03            | 1.01E-06              | 3.68E-07 | 2.00E-04      | 7.30E-05 | 3.35E-05      | 2.65E-05               | 6.65E-03                    | 5.25E-03 | 1.59E-05   | 3.16E-03   |
| Zinc (NC)                 | 6.68E-04           | 2.23E-03            | 2.53E-06              | 5.52E-07 | 8.42E-06      | 1.84E-06 | 2.97E-05      | 2.35E-05               | 9.90E-05                    | 7.83E-05 | 8.76E-04   | 2.92E-03   |

**Tabla 7      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.29E-02              | 2.37E-02           | NA                 | 1.59E-04           | 1.29E-02   | 2.37E-02   | NA         | 1.59E-04   | 1.23E-02   | 6.96E-03 | 1.47E-06   | 1.23E-02  | 6.96E-03 | 1.32E-03   | 3.77E-05   | 7.55E-03   | 8.24E-02 |
| Arsénico (C)              | 1.36E-05              | 2.52E-05           | NA                 | 1.41E-08           | 4.54E-02   | 8.39E-02   | NA         | 4.70E-05   | 1.41E-06   | 2.40E-07 | 1.69E-10   | 4.71E-03  | 7.99E-04 | NA         | 1.39E-06   | NA         | 1.87E-01 |
| Bario (NC)                | 1.43E-02              | 1.76E-02           | NA                 | 8.47E-08           | 7.15E-02   | 8.78E-02   | NA         | 4.24E-07   | 4.03E-05   | 2.27E-05 | 4.80E-09   | 2.01E-04  | 1.14E-04 | 4.30E-05   | 4.72E-06   | 9.44E-03   | 1.76E-01 |
| Cadmio (C)                | 7.00E-05              | 1.29E-04           | NA                 | 7.36E-09           | 7.00E-02   | 1.29E-01   | NA         | 7.36E-06   | 2.91E-07   | 1.64E-08 | 3.46E-11   | 2.91E-04  | 1.64E-05 | NA         | 4.22E-06   | NA         | 2.11E-01 |
| Cromo (C)                 | 5.08E-04              | 4.42E-02           | NA                 | 3.21E-06           | 1.69E-01   | 1.47E+01   | NA         | 1.07E-03   | 7.03E-05   | 3.97E-05 | 8.38E-09   | 2.34E-02  | 1.32E-02 | 3.75E-04   | 3.78E-07   | 3.78E-03   | 1.50E+01 |
| Cobalto (NC)              | 8.68E-05              | 1.92E-04           | NA                 | 1.64E-06           | 2.89E-01   | 6.41E-01   | NA         | 5.46E-03   | 7.72E-06   | 4.36E-07 | 9.21E-10   | 2.57E-02  | 1.45E-03 | 6.87E-04   | 1.89E-06   | 3.15E-01   | 1.35E+00 |
| Cobre (NC)                | 1.17E-01              | 4.24E-02           | NA                 | 9.35E-06           | 1.17E+00   | 4.24E-01   | NA         | 9.35E-05   | 1.79E-04   | 6.05E-05 | 2.13E-08   | 1.79E-03  | 6.05E-04 | 9.53E-05   | 4.16E-06   | 4.16E-03   | 1.61E+00 |
| Hierro (NC)               | 5.14E-02              | 9.49E-02           | NA                 | 1.68E-05           | 7.35E-02   | 1.36E-01   | NA         | 2.40E-05   | 3.20E-02   | 1.81E-02 | 3.82E-06   | 4.57E-02  | 2.58E-02 | NA         | 4.85E-05   | NA         | 1.12E-01 |
| Plomo (NC)                | 1.64E-05              | 2.26E-04           | NA                 | 1.88E-07           | 4.54E-03   | 6.29E-02   | NA         | 5.22E-05   | 8.49E-06   | 2.88E-07 | 1.01E-09   | 2.36E-03  | 7.99E-05 | NA         | 6.34E-06   | NA         | 7.88E-02 |
| Manganeso (NC)            | 4.53E-02              | 8.36E-02           | NA                 | 3.89E-05           | 7.55E-01   | 1.39E+00   | NA         | 6.49E-04   | 5.64E-04   | 3.19E-04 | 6.73E-08   | 9.40E-03  | 5.31E-03 | 6.02E-03   | 1.26E-07   | 2.52E-03   | 2.23E+00 |
| Mercurio (NC)             | 5.22E-06              | 1.57E-05           | NA                 | 1.05E-06           | 5.22E-02   | 1.57E-01   | NA         | 1.05E-02   | 4.41E-08   | 2.49E-08 | 5.26E-12   | 2.20E-05  | 1.24E-05 | 7.84E-08   | 4.41E-06   | 1.47E-02   | 2.46E-01 |
| Molibdeno (NC)            | 1.13E-03              | 2.08E-03           | NA                 | 3.42E-07           | 2.25E-01   | 4.16E-01   | NA         | 6.85E-05   | 1.17E-05   | 6.60E-07 | 1.39E-09   | 2.34E-03  | 1.32E-04 | 5.20E-07   | 6.33E-06   | 5.27E-04   | 6.46E-01 |
| Níquel (C)                | 5.00E-04              | 7.36E-03           | NA                 | 6.01E-07           | 4.16E-02   | 6.14E-01   | NA         | 5.01E-05   | 5.19E-06   | 5.86E-06 | 6.18E-10   | 4.32E-04  | 4.88E-04 | 1.54E-04   | 9.29E-06   | 5.16E-01   | 1.18E+00 |
| Selenio (NC)              | 5.00E-05              | 9.22E-05           | NA                 | 6.76E-07           | 1.00E-02   | 1.84E-02   | NA         | 1.35E-04   | 1.24E-06   | 7.03E-08 | 1.48E-10   | 2.49E-04  | 1.41E-05 | NA         | NA         | NA         | 3.67E-02 |
| Vanadio (NC)              | 5.21E-04              | 9.61E-04           | NA                 | 1.67E-06           | 1.03E-01   | 1.91E-01   | NA         | 3.31E-04   | 1.08E-04   | 6.10E-05 | 1.29E-08   | 2.14E-02  | 1.21E-02 | NA         | 1.13E-06   | NA         | 3.50E-01 |
| Zinc (NC)                 | 1.99E-02              | 6.10E-02           | NA                 | 1.30E-04           | 6.62E-02   | 2.03E-01   | NA         | 4.33E-04   | 3.24E-05   | 1.83E-05 | 3.87E-09   | 1.08E-04  | 6.11E-05 | NA         | 5.54E-06   | NA         | 2.75E-01 |

**Tabla 7      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 1.46E-03           | 0.00E+00              | 1.60E-04              | 5.85E-05 | NA             | NA       | 2.04E-03      | 1.61E-03               | NA                            | NA       | 1.67E-03   | NA           |
| Arsénico (C)             | 3.18E-06           | 4.77E-06              | 2.02E-07              | 7.36E-08 | 3.03E-07       | 1.10E-07 | 8.08E-07      | 1.92E-07               | 1.21E-06                      | 2.88E-07 | 1.76E-06   | 2.64E-06     |
| Bario (NC)               | 3.95E-04           | 0.00E+00              | 4.35E-06              | 1.59E-06 | NA             | NA       | 1.19E-05      | 9.40E-06               | NA                            | NA       | 1.66E-04   | NA           |
| Cadmio (C)               | 1.34E-06           | NA                    | 4.04E-08              | 1.47E-08 | NA             | NA       | 4.04E-08      | 3.19E-09               | NA                            | NA       | 1.59E-06   | NA           |
| Cromo (C)                | 5.73E-06           | NA                    | 2.02E-07              | 7.36E-08 | NA             | NA       | 3.93E-06      | 3.11E-06               | NA                            | NA       | 2.43E-05   | NA           |
| Cobalto (NC)             | 3.18E-06           | NA                    | 2.02E-07              | 2.95E-08 | NA             | NA       | 2.18E-06      | 1.73E-07               | NA                            | NA       | 2.48E-06   | NA           |
| Cobre (NC)               | 7.51E-05           | NA                    | 2.42E-06              | 8.84E-07 | NA             | NA       | 2.24E-05      | 1.06E-05               | NA                            | NA       | 2.54E-05   | NA           |
| Hierro (NC)              | 2.23E-03           | NA                    | 1.16E-04              | 4.22E-05 | NA             | NA       | 5.03E-03      | 3.97E-03               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 5.09E-06           | NA                    | 2.02E-07              | 7.36E-09 | NA             | NA       | 1.45E-06      | 6.87E-08               | NA                            | NA       | 5.95E-06   | NA           |
| Manganeso (NC)           | 7.64E-04           | NA                    | 1.14E-05              | 4.14E-06 | NA             | NA       | 9.17E-05      | 7.25E-05               | NA                            | NA       | 3.99E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 4.04E-09              | 1.47E-09 | NA             | NA       | 2.42E-09      | 1.92E-09               | NA                            | NA       | 4.65E-07   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 1.21E-07              | 4.42E-08 | NA             | NA       | 8.02E-07      | 6.34E-08               | NA                            | NA       | 2.26E-06   | NA           |
| Níquel (C)               | 7.00E-06           | NA                    | 2.02E-07              | 1.47E-08 | NA             | NA       | 1.00E-06      | 1.58E-06               | NA                            | NA       | 1.32E-05   | NA           |
| Selenio (NC)             | 8.27E-06           | 0.00E+00              | 2.02E-07              | 7.36E-08 | NA             | NA       | 1.62E-07      | 1.28E-08               | NA                            | NA       | 7.02E-06   | NA           |
| Vanadio (NC)             | 1.40E-05           | 0.00E+00              | 4.04E-07              | 1.47E-07 | NA             | NA       | 1.34E-05      | 1.06E-05               | NA                            | NA       | 6.37E-06   | NA           |
| Zinc (NC)                | 2.67E-04           | 0.00E+00              | 1.01E-06              | 2.21E-07 | NA             | NA       | 1.19E-05      | 9.39E-06               | NA                            | NA       | 3.51E-04   | NA           |

**Tabla 7      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 5.15E-03              | 9.50E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 4.93E-03   | 2.78E-03 | 5.88E-07   | NA        | NA       | NA         | 1.51E-05   | NA         | NA         |
| Arsénico (C)             | 5.45E-06              | 1.01E-05           | NA                 | 5.64E-09           | 8.18E-06     | 1.51E-05     | NA           | 8.46E-09     | 5.66E-07   | 9.58E-08 | 6.75E-11   | 8.49E-07  | 1.44E-07 | 4.53E-10   | 5.54E-07   | 8.31E-07   | 3.44E-05   |
| Bario (NC)               | 5.72E-03              | 7.02E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.61E-05   | 9.10E-06 | 1.92E-09   | NA        | NA       | NA         | 1.89E-06   | NA         | NA         |
| Cadmio (C)               | 2.80E-05              | 5.17E-05           | NA                 | 2.94E-09           | NA           | NA           | NA           | NA           | 1.16E-07   | 6.56E-09 | 1.39E-11   | NA        | NA       | 1.12E-10   | 1.69E-06   | 3.04E-06   | 3.04E-06   |
| Cromo (C)                | 2.03E-04              | 1.77E-02           | NA                 | 1.29E-06           | NA           | NA           | NA           | NA           | 2.81E-05   | 1.59E-05 | 3.35E-09   | NA        | NA       | 6.00E-07   | 1.51E-07   | 6.04E-06   | 6.64E-06   |
| Cobalto (NC)             | 3.47E-05              | 7.69E-05           | NA                 | 6.55E-07           | NA           | NA           | NA           | NA           | 3.09E-06   | 1.74E-07 | 3.68E-10   | NA        | NA       | NA         | 7.56E-07   | NA         | NA         |
| Cobre (NC)               | 4.69E-02              | 1.69E-02           | NA                 | 3.74E-06           | NA           | NA           | NA           | NA           | 7.14E-05   | 2.42E-05 | 8.52E-09   | NA        | NA       | NA         | 1.66E-06   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.28E-02   | 7.23E-03 | 1.53E-06   | NA        | NA       | NA         | 1.94E-05   | NA         | NA         |
| Plomo (NC)               | 6.54E-06              | 9.06E-05           | NA                 | 7.52E-08           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.15E-07 | 4.05E-10   | NA        | NA       | NA         | 2.54E-06   | NA         | NA         |
| Manganeso (NC)           | 1.81E-02              | 3.34E-02           | NA                 | 1.56E-05           | NA           | NA           | NA           | NA           | 2.26E-04   | 1.27E-04 | 2.69E-08   | NA        | NA       | NA         | 5.04E-08   | NA         | NA         |
| Mercurio (NC)            | 2.09E-06              | 6.27E-06           | NA                 | 4.18E-07           | NA           | NA           | NA           | NA           | 1.76E-08   | 9.95E-09 | 2.10E-12   | NA        | NA       | NA         | 1.76E-06   | NA         | NA         |
| Molibdeno (NC)           | 4.51E-04              | 8.31E-04           | NA                 | 1.37E-07           | NA           | NA           | NA           | NA           | 4.67E-06   | 2.64E-07 | 5.57E-10   | NA        | NA       | NA         | 2.53E-06   | NA         | NA         |
| Níquel (C)               | 2.00E-04              | 2.95E-03           | NA                 | 2.40E-07           | NA           | NA           | NA           | NA           | 2.07E-06   | 2.34E-06 | 2.47E-10   | NA        | NA       | 4.21E-10   | 3.71E-06   | 1.41E-06   | 1.41E-06   |
| Selenio (NC)             | 2.00E-05              | 3.69E-05           | NA                 | NA                 | NA           | NA           | NA           | NA           | 4.98E-07   | 2.81E-08 | 5.94E-11   | NA        | NA       | NA         | 1.51E-07   | NA         | NA         |
| Vanadio (NC)             | 2.08E-04              | 3.85E-04           | NA                 | NA                 | NA           | NA           | NA           | NA           | 4.32E-05   | 2.44E-05 | 5.16E-09   | NA        | NA       | NA         | 4.53E-07   | NA         | NA         |
| Zinc (NC)                | 7.94E-03              | 2.44E-02           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.30E-05   | 7.33E-06 | 1.55E-09   | NA        | NA       | NA         | 2.22E-06   | NA         | NA         |

<sup>(a)</sup>      Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:    Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

          Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



**Tabla 8      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP total |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                  |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.11E-01   | 1.21E-02 | 3.71E-06   | 2.11E-01  | 1.21E-02 | 1.32E-03   | 5.47E-06   | 1.09E-03   | 2.26E-01 |
| Arsénico (C)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.42E-05   | 4.17E-07 | 4.25E-10   | 8.08E-02  | 1.39E-03 | NA         | 2.29E-07   | NA         | 8.22E-02 |
| Bario (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.90E-04   | 3.96E-05 | 1.21E-08   | 3.45E-03  | 1.98E-04 | 4.30E-05   | 6.84E-07   | 1.37E-03   | 5.06E-03 |
| Cadmio (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.98E-06   | 2.85E-08 | 8.74E-11   | 4.98E-03  | 2.85E-05 | NA         | 6.11E-07   | NA         | 5.01E-03 |
| Cromo (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.20E-03   | 6.91E-05 | 2.11E-08   | 4.02E-01  | 2.30E-02 | NA         | 6.25E-08   | 6.25E-04   | 4.25E-01 |
| Cobalto (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.32E-04   | 7.58E-07 | 2.32E-09   | 4.41E-01  | 2.53E-03 | 6.87E-04   | 2.74E-07   | 4.56E-02   | 4.90E-01 |
| Cobre (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.06E-03   | 1.05E-04 | 5.37E-08   | 3.40E-02  | 1.17E-03 | 9.53E-05   | 6.88E-07   | 6.88E-04   | 3.60E-02 |
| Hierro (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.49E-01   | 3.15E-02 | 9.63E-06   | 7.84E-01  | 4.49E-02 | NA         | 7.03E-06   | NA         | 8.29E-01 |
| Plomo (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.45E-04   | 5.00E-07 | 2.55E-09   | 4.04E-02  | 1.39E-04 | NA         | 1.05E-06   | NA         | 4.05E-02 |
| Manganeso (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 9.67E-03   | 5.54E-04 | 1.70E-07   | 1.61E-01  | 9.24E-03 | 6.02E-03   | 1.83E-08   | 3.65E-04   | 1.77E-01 |
| Mercurio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.55E-07   | 4.33E-08 | 1.33E-11   | 3.78E-04  | 2.17E-05 | 7.84E-08   | 6.39E-07   | 2.13E-03   | 2.53E-03 |
| Molibdeno (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.00E-04   | 1.15E-06 | 3.51E-09   | 4.01E-02  | 2.30E-04 | 5.20E-07   | 9.17E-07   | 7.64E-05   | 4.04E-02 |
| Níquel (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.89E-05   | 1.02E-05 | 1.56E-09   | 7.41E-03  | 8.49E-04 | 1.54E-04   | 1.35E-06   | 7.52E-02   | 8.36E-02 |
| Talio (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.13E-05   | 1.22E-07 | 3.74E-10   | 4.27E-03  | 2.45E-05 | NA         | 6.25E-08   | NA         | 4.29E-03 |
| Vanadio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.85E-03   | 1.06E-04 | 3.25E-08   | 3.68E-01  | 2.11E-02 | NA         | 1.88E-07   | NA         | 3.89E-01 |
| Zinc (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.56E-04   | 3.19E-05 | 9.76E-09   | 1.85E-03  | 1.06E-04 | NA         | 8.03E-07   | NA         | 1.96E-03 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.



[illegible]

**Tabla 9      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.23E-02   | 6.96E-03 | 1.47E-06   | 1.23E-02  | 6.96E-03 | 1.32E-03   | 5.47E-06   | 1.09E-03   | 2.17E-02 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.41E-06   | 2.40E-07 | 1.69E-10   | 4.71E-03  | 7.99E-04 | NA         | 2.29E-07   | NA         | 5.51E-03 |
| Bario (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.03E-05   | 2.27E-05 | 4.80E-09   | 2.01E-04  | 1.14E-04 | 4.30E-05   | 6.84E-07   | 1.37E-03   | 1.73E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.91E-07   | 1.64E-08 | 3.46E-11   | 2.91E-04  | 1.64E-05 | NA         | 6.11E-07   | NA         | 3.07E-04 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.03E-05   | 3.97E-05 | 8.38E-09   | 2.34E-02  | 1.32E-02 | 3.75E-04   | 6.25E-08   | 6.25E-04   | 3.70E-02 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.72E-06   | 4.36E-07 | 9.21E-10   | 2.57E-02  | 1.45E-03 | 6.87E-04   | 2.74E-07   | 4.56E-02   | 7.35E-02 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.79E-04   | 6.05E-05 | 2.13E-08   | 1.79E-03  | 6.05E-04 | 9.53E-05   | 6.88E-07   | 6.88E-04   | 3.17E-03 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.20E-02   | 1.81E-02 | 3.82E-06   | 4.57E-02  | 2.58E-02 | NA         | 7.03E-06   | NA         | 7.16E-02 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.49E-06   | 2.88E-07 | 1.01E-09   | 2.36E-03  | 7.99E-05 | NA         | 1.05E-06   | NA         | 2.44E-03 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.64E-04   | 3.19E-04 | 6.73E-08   | 9.40E-03  | 5.31E-03 | 6.02E-03   | 1.83E-08   | 3.65E-04   | 2.11E-02 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.41E-08   | 2.49E-08 | 5.26E-12   | 2.20E-05  | 1.24E-05 | 7.84E-08   | 6.39E-07   | 2.13E-03   | 2.16E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.17E-05   | 6.60E-07 | 1.39E-09   | 2.34E-03  | 1.32E-04 | 5.20E-07   | 9.17E-07   | 7.64E-05   | 2.55E-03 |
| Níquel (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.19E-06   | 5.86E-06 | 6.18E-10   | 4.32E-04  | 4.88E-04 | 1.54E-04   | 1.35E-06   | 7.52E-02   | 7.63E-02 |
| Selenio (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.24E-06   | 7.03E-08 | 1.48E-10   | 2.49E-04  | 1.41E-05 | NA         | 6.25E-08   | NA         | 2.63E-04 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.08E-04   | 6.10E-05 | 1.29E-08   | 2.14E-02  | 1.21E-02 | NA         | 1.88E-07   | NA         | 3.36E-02 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.24E-05   | 1.83E-05 | 3.87E-09   | 1.08E-04  | 6.11E-05 | NA         | 8.03E-07   | NA         | 1.69E-04 |

**Tabla 9 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

[illegible]

**Tabla 9      Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.93E-03   | 2.78E-03 | 5.88E-07   | NA        | NA       | NA         | 2.19E-06   | NA         | NA         |
| Arsénico (C)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00     | 0.00E+00     | NA           | 0.00E+00     | 5.66E-07   | 9.58E-08 | 6.75E-11   | 8.49E-07  | 1.44E-07 | 4.53E-10   | 9.17E-08   | 1.38E-07   | 1.13E-06   |
| Bario (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.61E-05   | 9.10E-06 | 1.92E-09   | NA        | NA       | NA         | 2.74E-07   | NA         | NA         |
| Cadmio (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.16E-07   | 6.56E-09 | 1.39E-11   | NA        | NA       | 1.12E-10   | 2.45E-07   | 4.40E-07   | 4.40E-07   |
| Cromo (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.81E-05   | 1.59E-05 | 3.35E-09   | NA        | NA       | 6.00E-07   | 2.50E-08   | 1.00E-06   | 1.60E-06   |
| Cobalto (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.09E-06   | 1.74E-07 | 3.68E-10   | NA        | NA       | NA         | 1.10E-07   | NA         | NA         |
| Cobre (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 7.14E-05   | 2.42E-05 | 8.52E-09   | NA        | NA       | NA         | 2.75E-07   | NA         | NA         |
| Hierro (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.28E-02   | 7.23E-03 | 1.53E-06   | NA        | NA       | NA         | 2.81E-06   | NA         | NA         |
| Plomo (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.15E-07 | 4.05E-10   | NA        | NA       | NA         | 4.19E-07   | NA         | NA         |
| Manganeso (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.26E-04   | 1.27E-04 | 2.69E-08   | NA        | NA       | NA         | 7.30E-09   | NA         | NA         |
| Mercurio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.76E-08   | 9.95E-09 | 2.10E-12   | NA        | NA       | NA         | 2.56E-07   | NA         | NA         |
| Molibdeno (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.67E-06   | 2.64E-07 | 5.57E-10   | NA        | NA       | NA         | 3.67E-07   | NA         | NA         |
| Níquel (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.07E-06   | 2.34E-06 | 2.47E-10   | NA        | NA       | 4.21E-10   | 5.42E-07   | 2.06E-07   | 2.06E-07   |
| Selenio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.98E-07   | 2.81E-08 | 5.94E-11   | NA        | NA       | NA         | 2.50E-08   | NA         | NA         |
| Vanadio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.32E-05   | 2.44E-05 | 5.16E-09   | NA        | NA       | NA         | 7.50E-08   | NA         | NA         |
| Zinc (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.30E-05   | 7.33E-06 | 1.55E-09   | NA        | NA       | NA         | 3.21E-07   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Tabla 10    Resumen de Cocientes de Peligro/Valores de ILCR, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de Exposición en el Límite Superior

| Parámetro <sup>(a)</sup> | Poblaciones Costeras |          |            | Poblaciones Indígenas |          |            | Poblaciones Agrícolas |          |            | Poblaciones en la Línea de Cerco |          |            |
|--------------------------|----------------------|----------|------------|-----------------------|----------|------------|-----------------------|----------|------------|----------------------------------|----------|------------|
|                          | Niños Pequeños       | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños                   | Adultos  |            |
|                          | IP Total             | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total                         | IP Total | ILCR Total |
| Metales                  |                      |          |            |                       |          |            |                       |          |            |                                  |          |            |
| Aluminio (NC)            | 2.61E-01             | 4.62E-02 | NA         | 4.79E-01              | 1.34E-01 | NA         | 3.76E-01              | 8.24E-02 | NA         | 2.26E-01                         | 2.17E-02 | NA         |
| Arsénico (C)             | 4.23E-01             | 2.48E-01 | 4.43E-05   | 6.80E-01              | 3.65E-01 | 5.18E-05   | 3.98E-01              | 1.87E-01 | 3.44E-05   | 8.22E-02                         | 5.51E-03 | 1.13E-06   |
| Bario (NC)               | 9.69E-02             | 9.00E-02 | NA         | 2.00E-01              | 1.90E-01 | NA         | 1.86E-01              | 1.76E-01 | NA         | 5.06E-03                         | 1.73E-03 | NA         |
| Cadmio (C)               | 1.28E-01             | 1.18E-01 | 2.01E-07   | 2.69E-01              | 2.52E-01 | 1.56E-06   | 2.22E-01              | 2.11E-01 | 3.04E-06   | 5.01E-03                         | 3.07E-04 | 4.40E-07   |
| Cromo (C)                | 9.38E+00             | 8.98E+00 | 5.20E-07   | 1.70E+01              | 1.65E+01 | 3.70E-06   | 1.54E+01              | 1.50E+01 | 6.64E-06   | 4.25E-01                         | 3.70E-02 | 1.60E-06   |
| Cobalto (NC)             | 1.13E+00             | 6.25E-01 | NA         | 2.37E+00              | 1.46E+00 | NA         | 2.08E+00              | 1.35E+00 | NA         | 4.90E-01                         | 7.35E-02 | NA         |
| Cobre (NC)               | 8.58E-01             | 7.42E-01 | NA         | 1.87E+00              | 1.64E+00 | NA         | 1.83E+00              | 1.61E+00 | NA         | 3.60E-02                         | 3.17E-03 | NA         |
| Hierro (NC)              | 9.02E-01             | 7.25E-02 | NA         | 1.36E+00              | 1.54E-01 | NA         | 1.18E+00              | 1.12E-01 | NA         | 8.29E-01                         | 7.16E-02 | NA         |
| Plomo (NC)               | 9.10E-02             | 4.84E-02 | NA         | 1.83E-01              | 1.15E-01 | NA         | 1.36E-01              | 7.88E-02 | NA         | 4.05E-02                         | 2.44E-03 | NA         |
| Manganeso (NC)           | 1.41E+00             | 1.22E+00 | NA         | 2.72E+00              | 2.45E+00 | NA         | 2.47E+00              | 2.23E+00 | NA         | 1.77E-01                         | 2.11E-02 | NA         |
| Mercurio (NC)            | 3.20E-01             | 3.20E-01 | NA         | 3.15E-01              | 3.14E-01 | NA         | 2.47E-01              | 2.46E-01 | NA         | 2.53E-03                         | 2.16E-03 | NA         |
| Molibdeno (NC)           | 3.88E-01             | 3.47E-01 | NA         | 7.43E-01              | 6.93E-01 | NA         | 6.91E-01              | 6.46E-01 | NA         | 4.04E-02                         | 2.55E-03 | NA         |
| Níquel (C)               | 4.35E-01             | 4.26E-01 | 9.35E-08   | 1.02E+00              | 1.00E+00 | 7.24E-07   | 1.19E+00              | 1.18E+00 | 1.41E-06   | 8.36E-02                         | 7.63E-02 | 2.06E-07   |
| Selenio (NC)             | 4.96E-02             | 4.19E-02 | NA         | 7.23E-02              | 6.14E-02 | NA         | 4.40E-02              | 3.67E-02 | NA         | 4.29E-03                         | 2.63E-04 | NA         |
| Vanadio (NC)             | 6.09E-01             | 2.06E-01 | NA         | 9.25E-01              | 4.01E-01 | NA         | 8.22E-01              | 3.50E-01 | NA         | 3.89E-01                         | 3.36E-02 | NA         |
| Zinc (NC)                | 1.72E-01             | 1.68E-01 | NA         | 3.14E-01              | 3.09E-01 | NA         | 2.80E-01              | 2.75E-01 | NA         | 1.96E-03                         | 1.69E-04 | NA         |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

         Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

Tabla 11    Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimados del Límite Superior

| Parámetro      | Agua -<br>Suministro<br>de Agua de la<br>Comunidad<br>[mg/L] | Agua de Mar<br>[mg/L] | Agua -<br>Comercializa<br>ción Agrícola<br>[mg/L] | Agua -<br>Comunid.<br>Indígenas<br>[mg/L] | Sedimentos -<br>Agua Dulce<br>[mg/kg] | Sedimentos -<br>Marino/Estua<br>rino<br>[mg/kg] | Peces -<br>Comercializa<br>ción Agrícola<br>[mg/kg ww] | Peces -<br>Comunid.<br>Indígenas<br>[mg/kg ww] | Peces -<br>Marino/<br>Estuarino<br>[mg/kg ww] | Suelo<br>Costero<br>[mg/kg] | Suelo<br>Agrícola<br>[mg/kg] | Suelo<br>Indígena<br>[mg/kg] | Suelo Línea<br>de Cerco<br>[mg/kg] |
|----------------|--------------------------------------------------------------|-----------------------|---------------------------------------------------|-------------------------------------------|---------------------------------------|-------------------------------------------------|--------------------------------------------------------|------------------------------------------------|-----------------------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------------|
| Metales        |                                                              |                       |                                                   |                                           |                                       |                                                 |                                                        |                                                |                                               |                             |                              |                              |                                    |
| Aluminio (NC)  | 0.115                                                        | 0.457                 | 0.4                                               | 0.2                                       | 25,200                                | 7,864                                           | 165.4                                                  | 165.4                                          | 44                                            | 43,560.36                   | 43,631.47                    | 43,561.86                    | 44,139.515                         |
| Arsénico (C)   | 0.00025                                                      | 0.01                  | 0.002                                             | 0.001                                     | 10                                    | 13                                              | 1.749                                                  | 0.8745                                         | 0.3304                                        | 5.163015                    | 5.06                         | 5.10                         | 18.295101                          |
| Bario (NC)     | 0.031                                                        | 0.02825               | 0.03                                              | 0.03                                      | 147.2                                 | 7.7                                             | 49.35                                                  | 32.9                                           | 3.398                                         | 142.4009                    | 142.63                       | 142.41                       | 144.25214                          |
| Cadmio (C)     | 0.000105                                                     | 0.0002                | 0.00007                                           | 0.00009                                   | 0.5                                   | 0.5                                             | 0.1575                                                 | 0.196875                                       | 0.0372                                        | 1.161396                    | 1.28                         | 1.07                         | 4.5422012                          |
| Cromo (C)      | 0.00045                                                      | 0.0015                | 0.0004                                            | 0.0003                                    | 48.6                                  | 33.1                                            | 2.407                                                  | 2.407                                          | 0.9                                           | 249.2438                    | 249.00                       | 248.73                       | 275.26208                          |
| Cobalto (NC)   | 0.00025                                                      | 0.001                 | 0.001                                             | 0.001                                     | 27                                    | 14.7                                            | 0.327866667                                            | 0.4918                                         | 0.06                                          | 27.33431                    | 27.38                        | 27.32                        | 30.421279                          |
| Cobre (NC)     | 0.0059                                                       | 0.0165                | 0.008                                             | 0.009                                     | 276.8                                 | 10                                              | 2.523                                                  | 3.7845                                         | 0.8602                                        | 1,433.519                   | 677.70                       | 730.28                       | 11,318.945                         |
| Hierro (NC)    | 0.175                                                        | 0.525                 | 0.4                                               | 0.4                                       | 62,180                                | 40,070                                          |                                                        |                                                |                                               | 113,200.6                   | 113,348.15                   | 113,203.84                   | 11,4401.52                         |
| Plomo (NC)     | 0.0004                                                       | 0.001                 | 0.0004                                            | 0.0003                                    | 17.92                                 | 5                                               | 0.591                                                  | 0.591                                          | 0.076                                         | 30.60063                    | 30.15                        | 30.21                        | 55.991656                          |
| Manganeso (NC) | 0.06                                                         | 0.064                 | 0.04                                              | 0.03                                      | 1134                                  | 447.5                                           | 79.28                                                  | 59.46                                          | 11.78                                         | 1,994.181                   | 1,996.58                     | 1,994.18                     | 2,014.5943                         |
| Mercurio (NC)  | 0.00002                                                      | 0.00002               | 0.00002                                           | 0.00002                                   | 0.03                                  | 0.01                                            | 0.04614                                                | 0.04614                                        | 0.1386                                        | 0.186288                    | 0.31                         | 0.18                         | 2.7329872                          |
| Molibdeno (NC) | 0.0001                                                       | 0.0125                | 0.01                                              | 0.006                                     | 9.92                                  | 4                                               | 3.74                                                   | 6.732                                          | 0.0508                                        | 41.31031                    | 41.39                        | 41.31                        | 41.967573                          |
| Níquel (C)     | 0.00055                                                      | 0.002                 | 0.0004                                            | 0.0003                                    | 12.4                                  | 8.7                                             | 1.311                                                  | 1.9665                                         | 0.424                                         | 18.42383                    | 18.53                        | 18.40                        | 26.859463                          |
| Selenio (NC)   | 0.00065                                                      | 0.001                 | 0.0005                                            | 0.0008                                    | 2                                     | 2                                               | 0.87075                                                | 1.0449                                         | 0.9012                                        | 4.835831                    | 4.53                         | 4.70                         | 44.216666                          |
| Vanadio (NC)   | 0.0011                                                       | 0.004                 | 0.001                                             | 0.0009                                    | 165.8                                 | 180.4                                           | 0.632                                                  | 0.632                                          | 0.368                                         | 384.1757                    | 382.66                       | 382.72                       | 457.85546                          |
| Zinc (NC)      | 0.021                                                        | 0.005                 | 0.004                                             | 0.004                                     | 147                                   | 57.9                                            | 69.58                                                  | 69.58                                          | 37.86                                         | 114.7818                    | 115.25                       | 114.73                       | 119.04762                          |

Tabla 11    Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimados del Límite Superior (continuación)

| Parámetro      | Cultivos -<br>Fruta -<br>Agrícola<br>[mg/kg ww] | Cultivos -<br>Fruta -<br>INDÍGENA<br>[mg/kg ww] | Cultivos -<br>Arroz -<br>Agrícola<br>[mg/kg ww] | Cultivos -<br>Arroz Indígena<br>[mg/kg ww] | Alimentos -<br>Carne -<br>Agrícola<br>[mg/kg ww] | Alimentos -<br>Carne -<br>Indígena<br>[mg/kg ww] | Alimentos -<br>Pollo -<br>Agrícola<br>[mg/kg ww] | Alimentos -<br>Pollo -<br>Indígena<br>[mg/kg ww] | Aire - Rio<br>Caimito<br>[mg/m³] | Aire - Agrícola<br>[mg/m³] | Aire - Indígena<br>[mg/m³] | Aire - Línea de<br>Cerca<br>[mg/m³] |
|----------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|
| Metales        |                                                 |                                                 |                                                 |                                            |                                                  |                                                  |                                                  |                                                  |                                  |                            |                            |                                     |
| Aluminio (NC)  | 8.46                                            | 7.28                                            | 18.58                                           | 15.99                                      | 4.50E-01                                         | 4.49E-01                                         | 9.75E-01                                         | 9.73E-01                                         | 3.07E-05                         | 1.78E-04                   | 5.15E-05                   | 1.10E-03                            |
| Arsénico (C)   | 0.01                                            | 0.01                                            | 0.02                                            | 0.02                                       | 2.55E-05                                         | 2.58E-05                                         | 8.77E-05                                         | 8.86E-05                                         | 1.18E-06                         | 3.33E-06                   | 1.73E-06                   | 2.19E-06                            |
| Bario (NC)     | 8.07                                            | 8.06                                            | 11.79                                           | 11.76                                      | 3.27E-04                                         | 3.26E-04                                         | 5.20E-04                                         | 5.19E-04                                         | 3.75E-06                         | 1.14E-05                   | 5.82E-06                   | 6.73E-06                            |
| Cadmio (C)     | 0.05                                            | 0.04                                            | 0.12                                            | 0.09                                       | 5.22E-06                                         | 4.16E-06                                         | 5.68E-05                                         | 4.69E-05                                         | 3.47E-06                         | 1.02E-05                   | 5.23E-06                   | 5.55E-05                            |
| Cromo (C)      | 0.29                                            | 0.29                                            | 29.68                                           | 29.64                                      | 6.89E-03                                         | 6.88E-03                                         | 1.97E-02                                         | 1.97E-02                                         | 1.51E-06                         | 1.08E-06                   | 6.73E-07                   | 1.66E-05                            |
| Cobalto (NC)   | 0.05                                            | 0.05                                            | 0.13                                            | 0.13                                       | 1.26E-03                                         | 1.25E-03                                         | 1.01E-02                                         | 1.01E-02                                         | 1.51E-06                         | 4.56E-06                   | 2.33E-06                   | 2.50E-06                            |
| Cobre (NC)     | 71.67                                           | 77.95                                           | 32.03                                           | 36.09                                      | 1.57E-01                                         | 1.70E-01                                         | 6.15E-02                                         | 6.62E-02                                         | 7.31E-04                         | 6.54E-05                   | 1.19E-04                   | 6.66E-03                            |
| Hierro (NC)    | 31.51                                           | 29.05                                           | 69.17                                           | 63.77                                      | 6.15E-02                                         | 6.13E-02                                         | 1.03E-01                                         | 1.03E-01                                         | 4.01E-05                         | 3.48E-04                   | 7.03E-05                   | 2.27E-03                            |
| Plomo (NC)     | 0.01                                            | 0.01                                            | 0.16                                            | 0.16                                       | 1.69E-05                                         | 1.70E-05                                         | 1.16E-03                                         | 1.16E-03                                         | 5.90E-06                         | 1.53E-05                   | 7.94E-06                   | 1.66E-05                            |
| Manganeso (NC) | 25.60                                           | 25.53                                           | 56.20                                           | 56.04                                      | 5.57E-01                                         | 5.56E-01                                         | 2.39E-01                                         | 2.38E-01                                         | 1.65E-07                         | 5.49E-06                   | 3.57E-07                   | 3.83E-05                            |
| Mercurio (NC)  | 0.01                                            | 0.00                                            | 0.03                                            | 0.01                                       | 1.20E-03                                         | 6.68E-04                                         | 1.27E-02                                         | 7.26E-03                                         | 3.51E-06                         | 1.06E-05                   | 5.43E-06                   | 3.62E-06                            |
| Molibdeno (NC) | 0.64                                            | 0.63                                            | 1.40                                            | 1.39                                       | 9.27E-04                                         | 9.25E-04                                         | 2.10E-03                                         | 2.10E-03                                         | 5.03E-06                         | 1.52E-05                   | 7.79E-06                   | 5.62E-06                            |
| Níquel (C)     | 0.29                                            | 0.28                                            | 4.99                                            | 4.95                                       | 1.10E-03                                         | 1.09E-03                                         | 3.72E-03                                         | 3.69E-03                                         | 7.40E-06                         | 2.23E-05                   | 1.14E-05                   | 7.087E-06                           |
| Selenio (NC)   | 0.03                                            | 0.03                                            | 0.07                                            | 0.07                                       | 8.96E-04                                         | 9.33E-04                                         | 4.27E-03                                         | 4.43E-03                                         | 4.15E-07                         | 9.25E-07                   | 5.20E-07                   | 2.79E-06                            |
| Vanadio (NC)   | 0.30                                            | 0.30                                            | 0.66                                            | 0.67                                       | 1.63E-03                                         | 1.63E-03                                         | 1.02E-02                                         | 1.02E-02                                         | 4.31E-06                         | 2.98E-06                   | 1.93E-06                   | 4.72E-05                            |
| Zinc (NC)      | 11.25                                           | 11.19                                           | 41.09                                           | 40.88                                      | 6.13E-01                                         | 6.11E-01                                         | 7.99E-01                                         | 7.96E-01                                         | 4.43E-06                         | 1.35E-05                   | 6.87E-03                   | 1.195E-05                           |

Nota: Las tendencias centrales utilizaron como modelo las concentraciones de entrada para el medio ambiental: promedio para los datos distribuidos normalmente, geomedia para datos de registro normal y media para datos no paramétricos o datos que en su mayor parte no se detectaron.

**Tabla 12    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, caso de Impacto para Panamá - Estimaciones de Exposición del Límite Superior**

| Parámetro <sup>(a)</sup> | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|--------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
|                          | Exposición         | CP -Agua Para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                          | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>           |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)            | 6.27E-03           | 6.27E-03            | 3.96E-04              | 4.76E-05 | 3.96E-04      | 4.76E-05 | 1.09E-02      | 8.74E-04               | 1.09E-02                    | 8.74E-04 | 5.33E-03   | 5.33E-03   |
| Arsénico (C)             | 1.36E-05           | 4.55E-02            | 8.66E-06              | 1.04E-06 | 2.89E-02      | 3.47E-03 | 1.80E-05      | 4.34E-07               | 6.00E-02                    | 1.45E-03 | 4.00E-05   | 1.33E-01   |
| Bario (NC)               | 1.69E-03           | 8.45E-03            | 2.45E-05              | 2.94E-06 | 1.22E-04      | 1.47E-05 | 1.07E-05      | 8.56E-07               | 5.33E-05                    | 4.28E-06 | 4.11E-04   | 2.06E-03   |
| Cadmio (C)               | 5.73E-06           | 1.15E-02            | 1.73E-07              | 2.08E-08 | 3.46E-04      | 4.17E-05 | 6.93E-07      | 5.56E-09               | 6.93E-04                    | 5.56E-06 | 4.50E-06   | 4.50E-03   |
| Cromo (C)                | 2.45E-05           | 8.18E-03            | 1.30E-06              | 1.56E-07 | 4.33E-04      | 5.21E-05 | 4.59E-05      | 3.68E-06               | 1.53E-02                    | 1.23E-03 | 1.09E-04   | 3.63E-02   |
| Cobalto (NC)             | 1.36E-05           | 4.55E-02            | 8.66E-07              | 4.17E-08 | 2.89E-03      | 1.39E-04 | 2.04E-05      | 1.63E-07               | 6.79E-02                    | 5.45E-04 | 7.27E-06   | 2.42E-02   |
| Cobre (NC)               | 3.22E-04           | 3.58E-03            | 1.43E-05              | 1.72E-06 | 1.59E-04      | 1.91E-05 | 1.39E-05      | 6.67E-07               | 1.54E-04                    | 7.41E-06 | 1.04E-04   | 1.16E-03   |
| Hierro (NC)              | 9.55E-03           | 1.36E-02            | 4.55E-04              | 5.47E-05 | 6.49E-04      | 7.82E-05 | 5.55E-02      | 4.45E-03               | 7.93E-02                    | 6.36E-03 | 0.00E+00   | NA         |
| Plomo (NC)               | 2.18E-05           | 6.06E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 6.93E-06      | 3.34E-08               | 1.92E-03                    | 9.26E-06 | 9.20E-06   | 2.56E-03   |
| Manganeso (NC)           | 3.27E-03           | 5.45E-02            | 5.54E-05              | 6.67E-06 | 9.24E-04      | 1.11E-04 | 6.20E-04      | 4.97E-05               | 1.03E-02                    | 8.29E-04 | 1.43E-03   | 2.38E-02   |
| Mercurio (NC)            | 1.09E-06           | 5.45E-04            | 1.73E-08              | 2.08E-09 | 8.66E-06      | 1.04E-06 | 1.39E-08      | 1.11E-09               | 6.93E-06                    | 5.56E-07 | 1.68E-05   | 1.68E-01   |
| Molibdeno (NC)           | 5.45E-06           | 1.09E-03            | 1.08E-05              | 1.30E-06 | 2.16E-03      | 2.61E-04 | 5.54E-06      | 4.45E-08               | 1.11E-03                    | 8.89E-06 | 6.15E-06   | 1.23E-03   |
| Níquel (C)               | 3.00E-05           | 2.50E-03            | 1.73E-06              | 4.17E-08 | 1.44E-04      | 3.47E-06 | 1.21E-05      | 1.93E-06               | 1.00E-03                    | 1.61E-04 | 5.13E-05   | 4.28E-03   |
| Selenio (NC)             | 3.55E-05           | 7.09E-03            | 8.66E-07              | 1.04E-07 | 1.73E-04      | 2.08E-05 | 2.77E-06      | 2.22E-08               | 5.54E-04                    | 4.45E-06 | 1.09E-04   | 2.18E-02   |
| Vanadio (NC)             | 6.00E-05           | 1.19E-02            | 3.46E-06              | 4.17E-07 | 6.87E-04      | 8.27E-05 | 2.50E-04      | 2.01E-05               | 4.96E-02                    | 3.98E-03 | 4.46E-05   | 8.84E-03   |
| Zinc (NC)                | 1.15E-03           | 3.82E-03            | 4.33E-06              | 3.13E-07 | 1.44E-05      | 1.04E-06 | 8.02E-05      | 6.44E-06               | 2.67E-04                    | 2.15E-05 | 4.58E-03   | 1.53E-02   |



Tabla 12 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamáde Cobre Panamá, Caso de Impacto para Panamá - Estimaciones de Exposición del Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 6.17E-03              | 1.66E-02           | 1.01E-05           | 5.32E-04           | 6.17E-03   | 1.66E-02   | 1.01E-05   | 5.32E-04   | 2.11E-01   | 4.84E-03 | 7.41E-07   | 2.11E-01  | 4.84E-03 | 2.63E-04   | 2.56E-06   | 5.12E-04   | 2.64E-01 |
| Arsénico (C)              | 6.31E-06              | 1.70E-05           | 5.72E-10           | 4.79E-08           | 2.10E-02   | 5.67E-02   | 1.91E-06   | 1.60E-04   | 2.50E-05   | 1.72E-07 | 8.79E-11   | 8.34E-02  | 5.74E-04 | NA         | 9.86E-08   | NA         | 4.34E-01 |
| Bario (NC)                | 5.89E-03              | 1.06E-02           | 7.34E-09           | 2.84E-07           | 2.94E-02   | 5.28E-02   | 3.67E-08   | 1.42E-06   | 6.90E-04   | 1.58E-05 | 2.42E-09   | 3.45E-03  | 7.92E-05 | 8.60E-06   | 3.13E-07   | 6.25E-04   | 9.71E-02 |
| Cadmio (C)                | 3.90E-05              | 1.05E-04           | 1.17E-10           | 3.10E-08           | 3.90E-02   | 1.05E-01   | 1.17E-07   | 3.10E-05   | 5.63E-06   | 1.29E-08 | 1.98E-11   | 5.63E-03  | 1.29E-05 | NA         | 2.89E-07   | NA         | 1.67E-01 |
| Cromo (C)                 | 2.15E-04              | 2.66E-02           | 1.55E-07           | 1.08E-05           | 7.17E-02   | 8.86E+00   | 5.15E-05   | 3.59E-03   | 1.21E-03   | 2.77E-05 | 4.24E-09   | 4.03E-01  | 9.24E-03 | 7.53E-05   | 1.26E-07   | 1.26E-03   | 9.41E+00 |
| Cobalto (NC)              | 3.69E-05              | 1.19E-04           | 2.82E-08           | 5.50E-06           | 1.23E-01   | 3.95E-01   | 9.42E-05   | 1.83E-02   | 1.33E-04   | 3.04E-07 | 4.65E-10   | 4.42E-01  | 1.01E-03 | 1.38E-04   | 1.26E-07   | 2.10E-02   | 1.14E+00 |
| Cobre (NC)                | 5.23E-02              | 2.87E-02           | 3.53E-06           | 3.36E-05           | 5.81E-01   | 3.19E-01   | 3.92E-05   | 3.73E-04   | 6.95E-03   | 9.56E-05 | 2.44E-08   | 7.72E-02  | 1.06E-03 | 4.33E-05   | 6.09E-05   | 6.09E-02   | 1.04E+00 |
| Hierro (NC)               | 2.30E-02              | 6.19E-02           | 1.38E-06           | 5.62E-05           | 3.28E-02   | 8.85E-02   | 1.97E-06   | 8.03E-05   | 5.49E-01   | 1.26E-02 | 1.93E-06   | 7.84E-01  | 1.80E-02 | NA         | 3.34E-06   | NA         | 9.02E-01 |
| Plomo (NC)                | 8.37E-06              | 1.41E-04           | 3.80E-10           | 6.32E-07           | 2.33E-03   | 3.91E-02   | 1.06E-07   | 1.76E-04   | 1.48E-04   | 2.04E-07 | 5.21E-10   | 4.12E-02  | 5.67E-05 | NA         | 4.91E-07   | NA         | 9.37E-02 |
| Manganeso (NC)            | 1.87E-02              | 5.03E-02           | 1.25E-05           | 1.30E-04           | 3.11E-01   | 8.39E-01   | 2.08E-04   | 2.17E-03   | 9.67E-03   | 2.22E-04 | 3.39E-08   | 1.61E-01  | 3.69E-03 | 1.20E-03   | 1.38E-08   | 2.75E-04   | 1.41E+00 |
| Mercurio (NC)             | 5.71E-06              | 2.25E-05           | 2.69E-08           | 6.92E-06           | 5.71E-02   | 2.25E-01   | 2.69E-04   | 6.92E-02   | 9.03E-07   | 2.07E-08 | 3.17E-12   | 4.52E-04  | 1.04E-05 | 1.87E-08   | 2.93E-07   | 9.75E-04   | 5.21E-01 |
| Molibdeno (NC)            | 4.65E-04              | 1.25E-03           | 2.08E-08           | 1.15E-06           | 9.30E-02   | 2.50E-01   | 4.16E-06   | 2.30E-04   | 2.00E-04   | 4.59E-07 | 7.03E-10   | 4.01E-02  | 9.18E-05 | 1.04E-07   | 4.19E-07   | 3.49E-05   | 3.90E-01 |
| Níquel (C)                | 2.10E-04              | 4.47E-03           | 2.46E-08           | 2.03E-06           | 1.75E-02   | 3.73E-01   | 2.05E-06   | 1.69E-04   | 8.93E-05   | 4.10E-06 | 3.14E-10   | 7.44E-03  | 3.41E-04 | 3.09E-05   | 6.17E-07   | 3.43E-02   | 4.40E-01 |
| Selenio (NC)              | 2.24E-05              | 6.04E-05           | 2.01E-08           | 2.33E-06           | 4.48E-03   | 1.21E-02   | 4.02E-06   | 4.66E-04   | 2.34E-05   | 5.38E-08 | 8.23E-11   | 4.69E-03  | 1.08E-05 | NA         | 3.46E-08   | #DIV/0!    | 5.14E-02 |
| Vanadio (NC)              | 2.21E-04              | 5.95E-04           | 3.66E-08           | 5.59E-06           | 4.38E-02   | 1.18E-01   | 7.26E-06   | 1.11E-03   | 1.86E-03   | 4.27E-05 | 6.54E-09   | 3.70E-01  | 8.47E-03 | NA         | 3.59E-07   | NA         | 6.16E-01 |
| Zinc (NC)                 | 8.21E-03              | 3.68E-02           | 1.38E-05           | 4.36E-04           | 2.74E-02   | 1.23E-01   | 4.59E-05   | 1.45E-03   | 5.57E-04   | 1.28E-05 | 1.95E-09   | 1.86E-03  | 4.25E-05 | NA         | 3.69E-07   | NA         | 1.73E-01 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Nota: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 13    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.66E-03           | 3.66E-03            | 9.23E-05              | 3.36E-05 | 9.23E-05      | 3.36E-05 | 6.36E-04      | 5.02E-04               | 6.36E-04                    | 5.02E-04 | 5.33E-03   | 5.33E-03   |
| Arsénico (C)              | 7.96E-06           | 2.65E-02            | 2.02E-06              | 7.36E-07 | 6.74E-03      | 2.45E-03 | 1.05E-06      | 2.49E-07               | 3.50E-03                    | 8.31E-04 | 4.00E-05   | 1.33E-01   |
| Bario (NC)                | 9.87E-04           | 4.93E-03            | 5.71E-06              | 2.08E-06 | 2.85E-05      | 1.04E-05 | 6.22E-07      | 4.92E-07               | 3.11E-06                    | 2.46E-06 | 4.11E-04   | 2.06E-03   |
| Cadmio (C)                | 3.34E-06           | 6.68E-03            | 4.04E-08              | 1.47E-08 | 8.08E-05      | 2.95E-05 | 4.04E-08      | 3.19E-09               | 4.04E-05                    | 3.19E-06 | 4.50E-06   | 4.50E-03   |
| Cromo (C)                 | 1.43E-05           | 4.77E-03            | 3.03E-07              | 1.10E-07 | 1.01E-04      | 3.68E-05 | 2.68E-06      | 2.11E-06               | 8.92E-04                    | 7.05E-04 | 1.09E-04   | 3.63E-02   |
| Cobalto (NC)              | 7.96E-06           | 2.65E-02            | 2.02E-07              | 2.95E-08 | 6.74E-04      | 9.82E-05 | 1.19E-06      | 9.39E-08               | 3.96E-03                    | 3.13E-04 | 7.27E-06   | 2.42E-02   |
| Cobre (NC)                | 1.88E-04           | 1.88E-03            | 3.33E-06              | 1.21E-06 | 3.33E-05      | 1.21E-05 | 8.08E-07      | 3.83E-07               | 8.08E-06                    | 3.83E-06 | 1.04E-04   | 1.04E-03   |
| Hierro (NC)               | 5.57E-03           | 7.96E-03            | 1.06E-04              | 3.87E-05 | 1.52E-04      | 5.52E-05 | 3.24E-03      | 2.56E-03               | 4.63E-03                    | 3.66E-03 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.27E-05           | 3.54E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 4.04E-07      | 1.92E-08               | 1.12E-04                    | 5.32E-06 | 9.20E-06   | 2.56E-03   |
| Manganeso (NC)            | 1.91E-03           | 3.18E-02            | 1.29E-05              | 4.71E-06 | 2.16E-04      | 7.85E-05 | 3.62E-05      | 2.86E-05               | 6.03E-04                    | 4.77E-04 | 1.43E-03   | 2.38E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 4.04E-09              | 1.47E-09 | 2.02E-06      | 7.36E-07 | 8.08E-10      | 6.39E-10               | 4.04E-07                    | 3.19E-07 | 1.68E-05   | 1.68E-01   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 2.53E-06              | 9.20E-07 | 5.05E-04      | 1.84E-04 | 3.23E-07      | 2.56E-08               | 6.47E-05                    | 5.11E-06 | 6.15E-06   | 1.23E-03   |
| Níquel (C)                | 1.75E-05           | 1.46E-03            | 4.04E-07              | 2.95E-08 | 3.37E-05      | 2.45E-06 | 7.03E-07      | 1.11E-06               | 5.86E-05                    | 9.26E-05 | 5.13E-05   | 4.28E-03   |
| Selenio (NC)              | 2.07E-05           | 4.14E-03            | 2.02E-07              | 7.36E-08 | 4.04E-05      | 1.47E-05 | 1.62E-07      | 1.28E-08               | 3.23E-05                    | 2.56E-06 | 1.09E-04   | 2.18E-02   |
| Vanadio (NC)              | 3.50E-05           | 6.95E-03            | 8.08E-07              | 2.95E-07 | 1.60E-04      | 5.84E-05 | 1.46E-05      | 1.15E-05               | 2.89E-03                    | 2.29E-03 | 4.46E-05   | 8.84E-03   |
| Zinc (NC)                 | 6.68E-04           | 2.23E-03            | 1.01E-06              | 2.21E-07 | 3.37E-06      | 7.36E-07 | 4.68E-06      | 3.70E-06               | 1.56E-05                    | 1.23E-05 | 4.58E-03   | 1.53E-02   |

Tabla 13 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre PanamáMina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 6.17E-03              | 1.66E-02           | 1.01E-05           | 5.32E-04           | 6.17E-03   | 1.66E-02   | 1.01E-05   | 5.32E-04   | 1.23E-02   | 2.78E-03 | 2.94E-07   | 1.23E-02  | 2.78E-03 | 2.63E-04   | 2.56E-06   | 5.12E-04   | 4.95E-02 |
| Arsénico (C)              | 6.31E-06              | 1.70E-05           | 5.72E-10           | 4.79E-08           | 2.10E-02   | 5.67E-02   | 1.91E-06   | 1.60E-04   | 1.46E-06   | 9.90E-08 | 3.48E-11   | 4.87E-03  | 3.30E-04 | NA         | 9.86E-08   | NA         | 2.56E-01 |
| Bario (NC)                | 5.89E-03              | 1.06E-02           | 7.34E-09           | 2.84E-07           | 2.94E-02   | 5.28E-02   | 3.67E-08   | 1.42E-06   | 4.03E-05   | 9.10E-06 | 9.61E-10   | 2.01E-04  | 4.55E-05 | 8.60E-06   | 3.13E-07   | 6.25E-04   | 9.02E-02 |
| Cadmio (C)                | 3.90E-05              | 1.05E-04           | 1.17E-10           | 3.10E-08           | 3.90E-02   | 1.05E-01   | 1.17E-07   | 3.10E-05   | 3.29E-07   | 7.42E-09 | 7.84E-12   | 3.29E-04  | 7.42E-06 | NA         | 2.89E-07   | NA         | 1.56E-01 |
| Cromo (C)                 | 2.15E-04              | 2.66E-02           | 1.55E-07           | 1.08E-05           | 7.17E-02   | 8.86E+00   | 5.15E-05   | 3.59E-03   | 7.05E-05   | 1.59E-05 | 1.68E-09   | 2.35E-02  | 5.31E-03 | 7.53E-05   | 1.26E-07   | 1.26E-03   | 9.01E+00 |
| Cobalto (NC)              | 3.69E-05              | 1.19E-04           | 2.82E-08           | 5.50E-06           | 1.23E-01   | 3.95E-01   | 9.42E-05   | 1.83E-02   | 7.73E-06   | 1.75E-07 | 1.84E-10   | 2.58E-02  | 5.82E-04 | 1.38E-04   | 1.26E-07   | 2.10E-02   | 6.40E-01 |
| Cobre (NC)                | 5.23E-02              | 2.87E-02           | 3.53E-06           | 3.36E-05           | 5.23E-01   | 2.87E-01   | 3.53E-05   | 3.36E-04   | 4.06E-04   | 5.50E-05 | 9.67E-09   | 4.06E-03  | 5.50E-04 | 4.33E-05   | 6.09E-05   | 6.09E-02   | 8.79E-01 |
| Hierro (NC)               | 2.30E-02              | 6.19E-02           | 1.38E-06           | 5.62E-05           | 3.28E-02   | 8.85E-02   | 1.97E-06   | 8.03E-05   | 3.20E-02   | 7.23E-03 | 7.64E-07   | 4.57E-02  | 1.03E-02 | NA         | 3.34E-06   | NA         | 7.25E-02 |
| Plomo (NC)                | 8.37E-06              | 1.41E-04           | 3.80E-10           | 6.32E-07           | 2.33E-03   | 3.91E-02   | 1.06E-07   | 1.76E-04   | 8.66E-06   | 1.17E-07 | 2.06E-10   | 2.40E-03  | 3.26E-05 | NA         | 4.91E-07   | NA         | 5.03E-02 |
| Manganeso (NC)            | 1.87E-02              | 5.03E-02           | 1.25E-05           | 1.30E-04           | 3.11E-01   | 8.39E-01   | 2.08E-04   | 2.17E-03   | 5.64E-04   | 1.27E-04 | 1.35E-08   | 9.40E-03  | 2.12E-03 | 1.20E-03   | 1.38E-08   | 2.75E-04   | 1.22E+00 |
| Mercurio (NC)             | 5.71E-06              | 2.25E-05           | 2.69E-08           | 6.92E-06           | 5.71E-02   | 2.25E-01   | 2.69E-04   | 6.92E-02   | 5.27E-08   | 1.19E-08 | 1.26E-12   | 2.63E-05  | 5.95E-06 | 1.87E-08   | 2.93E-07   | 9.75E-04   | 5.21E-01 |
| Molibdeno (NC)            | 4.65E-04              | 1.25E-03           | 2.08E-08           | 1.15E-06           | 9.30E-02   | 2.50E-01   | 4.16E-06   | 2.30E-04   | 1.17E-05   | 2.64E-07 | 2.79E-10   | 2.34E-03  | 5.28E-05 | 1.04E-07   | 4.19E-07   | 3.49E-05   | 3.49E-01 |
| Níquel (C)                | 2.10E-04              | 4.47E-03           | 2.46E-08           | 2.03E-06           | 1.75E-02   | 3.73E-01   | 2.05E-06   | 1.69E-04   | 5.21E-06   | 2.35E-06 | 1.24E-10   | 4.34E-04  | 1.96E-04 | 3.09E-05   | 6.17E-07   | 3.43E-02   | 4.31E-01 |
| Selenio (NC)              | 2.24E-05              | 6.04E-05           | 2.01E-08           | 2.33E-06           | 4.48E-03   | 1.21E-02   | 4.02E-06   | 4.66E-04   | 1.37E-06   | 3.09E-08 | 3.26E-11   | 2.74E-04  | 6.18E-06 | NA         | NA         | NA         | 4.34E-02 |
| Vanadio (NC)              | 2.21E-04              | 5.95E-04           | 3.66E-08           | 5.59E-06           | 4.38E-02   | 1.18E-01   | 7.26E-06   | 1.11E-03   | 1.09E-04   | 2.45E-05 | 2.59E-09   | 2.16E-02  | 4.87E-03 | NA         | 3.59E-07   | NA         | 2.11E-01 |
| Zinc (NC)                 | 8.21E-03              | 3.68E-02           | 1.38E-05           | 4.36E-04           | 2.74E-02   | 1.23E-01   | 4.59E-05   | 1.45E-03   | 3.25E-05   | 7.33E-06 | 7.74E-10   | 1.08E-04  | 2.44E-05 | NA         | 3.69E-07   | NA         | 1.69E-01 |

Tabla 13 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre PanamáMina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación Cancerígena   |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|------------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                        | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR - Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión              | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| Metales                  |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 1.46E-03           | NA                     | 3.69E-05              | 1.35E-05 | NA             | NA       | 8.15E-04      | 6.44E-04               | NA                            | NA       | 8.01E-03   | NA           |
| Arsénico (C)             | 3.18E-06           | 4.77E-06               | 8.08E-07              | 2.95E-07 | 1.21E-06       | 4.42E-07 | 4.20E-07      | 9.97E-08               | 2.80E-07                      | 1.50E-07 | 1.60E-05   | 2.40E-05     |
| Bario (NC)               | 3.95E-04           | NA                     | 2.28E-06              | 8.32E-07 | NA             | NA       | 2.49E-07      | 1.97E-07               | NA                            | NA       | 1.65E-04   | NA           |
| Cadmio (C)               | 1.34E-06           | NA                     | 1.62E-08              | 5.89E-09 | NA             | NA       | 1.62E-08      | 1.28E-09               | NA                            | NA       | 1.80E-06   | NA           |
| Cromo (C)                | 5.73E-06           | NA                     | 1.21E-07              | 4.42E-08 | NA             | NA       | 1.07E-06      | 8.46E-07               | NA                            | NA       | 4.36E-05   | NA           |
| Cobalto (NC)             | 3.18E-06           | NA                     | 8.08E-08              | 1.18E-08 | NA             | NA       | 4.75E-07      | 3.76E-08               | NA                            | NA       | 2.91E-06   | NA           |
| Cobre (NC)               | 7.51E-05           | NA                     | 1.33E-06              | 4.86E-07 | NA             | NA       | 3.23E-07      | 1.53E-07               | NA                            | NA       | 4.17E-05   | NA           |
| Hierro (NC)              | 2.23E-03           | NA                     | 4.24E-05              | 1.55E-05 | NA             | NA       | 1.30E-03      | 1.02E-03               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 5.09E-06           | NA                     | 8.08E-08              | 2.95E-09 | NA             | NA       | 1.62E-07      | 7.67E-09               | NA                            | NA       | 3.68E-06   | NA           |
| Manganeso (NC)           | 7.64E-04           | NA                     | 5.17E-06              | 1.88E-06 | NA             | NA       | 1.45E-05      | 1.14E-05               | NA                            | NA       | 5.71E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                     | 1.62E-09              | 5.89E-10 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 6.71E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                     | 1.01E-06              | 3.68E-07 | NA             | NA       | 1.29E-07      | 1.02E-08               | NA                            | NA       | 2.46E-06   | NA           |
| Níquel (C)               | 7.00E-06           | NA                     | 1.62E-07              | 1.18E-08 | NA             | NA       | 2.81E-07      | 4.45E-07               | NA                            | NA       | 2.05E-05   | NA           |
| Selenio (NC)             | 8.27E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.47E-08      | 5.11E-09               | NA                            | NA       | 4.37E-05   | NA           |
| Vanadio (NC)             | 1.40E-05           | NA                     | 3.23E-07              | 1.18E-07 | NA             | NA       | 5.83E-06      | 4.61E-06               | NA                            | NA       | 1.78E-05   | NA           |
| Zinc (NC)                | 2.67E-04           | NA                     | 4.04E-07              | 8.84E-08 | NA             | NA       | 1.87E-06      | 1.48E-06               | NA                            | NA       | 1.83E-03   | NA           |

Tabla 13 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre PanamáMina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 2.47E-03              | 6.65E-03           | 4.04E-06           | 2.13E-04           | NA           | NA           | NA           | NA           | 4.93E-03   | 1.11E-03 | 1.18E-07   | NA        | NA       | NA         | 1.02E-06   | NA         | NA         |
| Arsénico (C)             | 2.52E-06              | 6.80E-06           | 2.29E-10           | 1.91E-08           | 3.78E-06     | 1.02E-05     | 3.43E-10     | 2.87E-08     | 5.84E-07   | 3.96E-08 | 1.39E-11   | 8.76E-07  | 5.94E-08 | 9.35E-11   | 3.94E-08   | 5.91E-08   | 4.59E-05   |
| Bario (NC)               | 2.36E-03              | 4.22E-03           | 2.93E-09           | 1.13E-07           | NA           | NA           | NA           | NA           | 1.61E-05   | 3.64E-06 | 3.84E-10   | NA        | NA       | NA         | 1.25E-07   | NA         | NA         |
| Cadmio (C)               | 1.56E-05              | 4.20E-05           | 4.69E-11           | 1.24E-08           | NA           | NA           | NA           | NA           | 1.31E-07   | 2.97E-09 | 3.13E-12   | NA        | NA       | 2.52E-11   | 1.16E-07   | 2.08E-07   | 2.08E-07   |
| Cromo (C)                | 8.60E-05              | 1.06E-02           | 6.18E-08           | 4.31E-06           | NA           | NA           | NA           | NA           | 2.82E-05   | 6.37E-06 | 6.73E-10   | NA        | NA       | 1.20E-07   | 5.03E-08   | 2.01E-06   | 2.13E-06   |
| Cobalto (NC)             | 1.47E-05              | 4.75E-05           | 1.13E-08           | 2.20E-06           | NA           | NA           | NA           | NA           | 3.09E-06   | 6.99E-08 | 7.38E-11   | NA        | NA       | NA         | 5.04E-08   | NA         | NA         |
| Cobre (NC)               | 2.09E-02              | 1.15E-02           | 1.41E-06           | 1.34E-05           | NA           | NA           | NA           | NA           | 1.62E-04   | 2.20E-05 | 3.87E-09   | NA        | NA       | NA         | 2.44E-05   | NA         | NA         |
| Hierro (NC)              | 9.19E-03              | 2.48E-02           | 5.52E-07           | 2.25E-05           | NA           | NA           | NA           | NA           | 1.28E-02   | 2.89E-03 | 3.06E-07   | NA        | NA       | NA         | 1.34E-06   | NA         | NA         |
| Plomo (NC)               | 3.35E-06              | 5.64E-05           | 1.52E-10           | 2.53E-07           | NA           | NA           | NA           | NA           | 3.46E-06   | 4.69E-08 | 8.26E-11   | NA        | NA       | NA         | 1.97E-07   | NA         | NA         |
| Manganeso (NC)           | 7.47E-03              | 2.01E-02           | 5.00E-06           | 5.21E-05           | NA           | NA           | NA           | NA           | 2.26E-04   | 5.10E-05 | 5.38E-09   | NA        | NA       | NA         | 5.50E-09   | NA         | NA         |
| Mercurio (NC)            | 2.28E-06              | 9.01E-06           | 1.07E-08           | 2.77E-06           | NA           | NA           | NA           | NA           | 2.11E-08   | 4.76E-09 | 5.03E-13   | NA        | NA       | NA         | 1.17E-07   | NA         | NA         |
| Molibdeno (NC)           | 1.86E-04              | 5.01E-04           | 8.32E-09           | 4.59E-07           | NA           | NA           | NA           | NA           | 4.67E-06   | 1.06E-07 | 1.11E-10   | NA        | NA       | NA         | 1.68E-07   | NA         | NA         |
| Níquel (C)               | 8.39E-05              | 1.79E-03           | 9.84E-09           | 8.13E-07           | NA           | NA           | NA           | NA           | 2.08E-06   | 9.42E-07 | 4.97E-11   | NA        | NA       | 8.45E-11   | 2.47E-07   | 9.37E-08   | 9.38E-08   |
| Selenio (NC)             | 8.96E-06              | 2.42E-05           | 8.05E-09           | 9.32E-07           | NA           | NA           | NA           | NA           | 5.47E-07   | 1.24E-08 | 1.31E-11   | NA        | NA       | NA         | NA         | NA         | NA         |
| Vanadio (NC)             | 8.83E-05              | 2.38E-04           | 1.46E-08           | 2.24E-06           | NA           | NA           | NA           | NA           | 4.35E-05   | 9.82E-06 | 1.04E-09   | NA        | NA       | NA         | 1.44E-07   | NA         | NA         |
| Zinc (NC)                | 3.28E-03              | 1.47E-02           | 5.51E-06           | 1.74E-04           | NA           | NA           | NA           | NA           | 1.30E-05   | 2.93E-06 | 3.10E-10   | NA        | NA       | NA         | 1.48E-07   | NA         | NA         |

(a) Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 14    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 1.09E-02           | 1.09E-02            | 6.06E-04              | 7.30E-05 | 6.06E-04      | 7.30E-05 | 1.22E-01      | 9.81E-03               | 1.22E-01                    | 9.81E-03 | 2.88E-02   | 2.88E-02   |
| Arsénico (C)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 3.65E-07 | 1.01E-02      | 1.22E-03 | 4.85E-05      | 1.17E-06               | 1.62E-01                    | 3.89E-03 | 1.52E-04   | 5.08E-01   |
| Bario (NC)                | 1.64E-03           | 8.18E-03            | 9.09E-05              | 1.09E-05 | 4.55E-04      | 5.47E-05 | 7.14E-04      | 5.73E-05               | 3.57E-03                    | 2.86E-04 | 5.74E-03   | 2.87E-02   |
| Cadmio (C)                | 4.91E-06           | 9.82E-03            | 2.73E-07              | 3.28E-08 | 5.45E-04      | 6.57E-05 | 2.42E-06      | 1.95E-08               | 2.42E-03                    | 1.95E-05 | 3.43E-05   | 3.43E-02   |
| Cromo (C)                 | 1.64E-05           | 5.45E-03            | 9.09E-07              | 1.09E-07 | 3.03E-04      | 3.65E-05 | 2.36E-04      | 1.89E-05               | 7.85E-02                    | 6.30E-03 | 4.20E-04   | 1.40E-01   |
| Cobalto (NC)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 1.46E-07 | 1.01E-02      | 4.86E-04 | 1.31E-04      | 1.05E-06               | 4.36E-01                    | 3.50E-03 | 8.58E-05   | 2.86E-01   |
| Cobre (NC)                | 4.91E-04           | 5.45E-03            | 2.73E-05              | 3.28E-06 | 3.03E-04      | 3.65E-05 | 1.34E-03      | 6.46E-05               | 1.49E-02                    | 7.18E-04 | 6.60E-04   | 7.33E-03   |
| Hierro (NC)               | 2.18E-02           | 3.12E-02            | 1.21E-03              | 1.46E-04 | 1.73E-03      | 2.08E-04 | 3.01E-01      | 2.42E-02               | 4.31E-01                    | 3.46E-02 | NA         | NA         |
| Plomo (NC)                | 1.64E-05           | 4.55E-03            | 9.09E-07              | 1.09E-08 | 2.53E-04      | 3.04E-06 | 8.69E-05      | 4.18E-07               | 2.41E-02                    | 1.16E-04 | 1.03E-04   | 2.86E-02   |
| Manganeso (NC)            | 1.64E-03           | 2.73E-02            | 9.09E-05              | 1.09E-05 | 1.52E-03      | 1.82E-04 | 5.50E-03      | 4.41E-04               | 9.16E-02                    | 7.35E-03 | 1.04E-02   | 1.73E-01   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 6.06E-08              | 7.30E-09 | 3.03E-05      | 3.65E-06 | 1.45E-07      | 1.17E-08               | 7.27E-05                    | 5.84E-06 | 8.05E-06   | 8.05E-02   |
| Molibdeno (NC)            | 3.27E-04           | 6.55E-02            | 1.82E-05              | 2.19E-06 | 3.64E-03      | 4.38E-04 | 4.81E-05      | 3.86E-07               | 9.62E-03                    | 7.72E-05 | 1.17E-03   | 2.35E-01   |
| Níquel (C)                | 1.64E-05           | 1.36E-03            | 9.09E-07              | 2.19E-08 | 7.58E-05      | 1.82E-06 | 6.01E-05      | 9.65E-06               | 5.01E-03                    | 8.04E-04 | 3.43E-04   | 2.86E-02   |
| Selenio (NC)              | 4.36E-05           | 8.73E-03            | 2.42E-06              | 2.92E-07 | 4.85E-04      | 5.84E-05 | 9.70E-06      | 7.78E-08               | 1.94E-03                    | 1.56E-05 | 1.82E-04   | 3.64E-02   |
| Vanadio (NC)              | 4.91E-05           | 9.74E-03            | 2.73E-06              | 3.28E-07 | 5.41E-04      | 6.52E-05 | 8.04E-04      | 6.45E-05               | 1.59E-01                    | 1.28E-02 | 1.10E-04   | 2.19E-02   |
| Zinc (NC)                 | 2.18E-04           | 7.27E-04            | 1.21E-05              | 8.76E-07 | 4.04E-05      | 2.92E-06 | 7.13E-04      | 5.72E-05               | 2.38E-03                    | 1.91E-04 | 1.21E-02   | 4.04E-02   |

**Tabla 14**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamáde Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.27E-02              | 2.61E-02           | NA                 | 4.24E-05           | 1.27E-02   | 2.61E-02   | NA         | 4.24E-05   | 2.11E-01   | 1.69E-02 | 3.71E-06   | 2.11E-01  | 1.69E-02 | 1.32E-03   | 2.15E-05   | 4.30E-03   | 4.45E-01 |
| Arsénico (C)              | 1.61E-05              | 3.30E-05           | NA                 | 3.86E-09           | 5.36E-02   | 1.10E-01   | NA         | 1.29E-05   | 2.47E-05   | 5.95E-07 | 4.34E-10   | 8.24E-02  | 1.98E-03 | NA         | 7.20E-07   | NA         | 1.11E+00 |
| Bario (NC)                | 1.41E-02              | 1.92E-02           | NA                 | 2.26E-08           | 7.05E-02   | 9.62E-02   | NA         | 1.13E-07   | 6.90E-04   | 5.54E-05 | 1.21E-08   | 3.45E-03  | 2.77E-04 | 4.30E-05   | 2.43E-06   | 4.85E-03   | 2.17E-01 |
| Cadmio (C)                | 7.29E-05              | 1.49E-04           | NA                 | 2.05E-09           | 7.29E-02   | 1.49E-01   | NA         | 2.05E-06   | 5.18E-06   | 4.16E-08 | 9.09E-11   | 5.18E-03  | 4.16E-05 | NA         | 2.18E-06   | NA         | 2.75E-01 |
| Cromo (C)                 | 5.07E-04              | 4.85E-02           | NA                 | 8.59E-07           | 1.69E-01   | 1.62E+01   | NA         | 2.86E-04   | 1.21E-03   | 9.68E-05 | 2.12E-08   | 4.02E-01  | 3.23E-02 | 3.75E-04   | 2.80E-07   | 2.80E-03   | 1.70E+01 |
| Cobalto (NC)              | 8.64E-05              | 2.12E-04           | NA                 | 4.38E-07           | 2.88E-01   | 7.07E-01   | NA         | 1.46E-03   | 1.32E-04   | 1.06E-06 | 2.32E-09   | 4.41E-01  | 3.54E-03 | 6.87E-04   | 9.73E-07   | 1.62E-01   | 2.52E+00 |
| Cobre (NC)                | 1.36E-01              | 5.90E-02           | NA                 | 2.89E-06           | 1.52E+00   | 6.56E-01   | NA         | 3.21E-05   | 3.54E-03   | 1.70E-04 | 6.21E-08   | 3.93E-02  | 1.89E-03 | 1.10E-04   | 4.98E-05   | 4.98E-02   | 2.29E+00 |
| Hierro (NC)               | 5.09E-02              | 1.04E-01           | NA                 | 4.48E-06           | 7.27E-02   | 1.49E-01   | NA         | 6.40E-06   | 5.49E-01   | 4.40E-02 | 9.63E-06   | 7.84E-01  | 6.29E-02 | NA         | 2.93E-05   | NA         | 1.35E+00 |
| Plomo (NC)                | 2.14E-05              | 2.60E-04           | NA                 | 5.06E-08           | 5.95E-03   | 7.24E-02   | NA         | 1.40E-05   | 1.46E-04   | 7.05E-07 | 2.57E-09   | 4.07E-02  | 1.96E-04 | NA         | 3.31E-06   | NA         | 1.77E-01 |
| Manganeso (NC)            | 4.47E-02              | 9.16E-02           | NA                 | 1.04E-05           | 7.45E-01   | 1.53E+00   | NA         | 1.73E-04   | 9.67E-03   | 7.76E-04 | 1.70E-07   | 1.61E-01  | 1.29E-02 | 6.02E-03   | 1.49E-07   | 2.98E-03   | 2.76E+00 |
| Mercurio (NC)             | 6.31E-06              | 2.04E-05           | NA                 | 3.17E-07           | 6.31E-02   | 2.04E-01   | NA         | 3.17E-03   | 8.56E-07   | 6.87E-08 | 1.50E-11   | 4.28E-04  | 3.43E-05 | 8.88E-08   | 2.26E-06   | 7.53E-03   | 3.60E-01 |
| Molibdeno (NC)            | 1.11E-03              | 2.28E-03           | NA                 | 9.15E-08           | 2.22E-01   | 4.56E-01   | NA         | 1.83E-05   | 2.00E-04   | 1.61E-06 | 3.52E-09   | 4.01E-02  | 3.21E-04 | 5.20E-07   | 3.24E-06   | 2.70E-04   | 1.03E+00 |
| Níquel (C)                | 4.96E-04              | 8.10E-03           | NA                 | 1.61E-07           | 4.14E-02   | 6.75E-01   | NA         | 1.34E-05   | 8.92E-05   | 1.43E-05 | 1.57E-09   | 7.43E-03  | 1.19E-03 | 1.54E-04   | 4.76E-06   | 2.65E-01   | 1.03E+00 |
| Selenio (NC)              | 5.96E-05              | 1.22E-04           | NA                 | 1.93E-07           | 1.19E-02   | 2.44E-02   | NA         | 3.87E-05   | 2.28E-05   | 1.83E-07 | 4.00E-10   | 4.56E-03  | 3.66E-05 | NA         | 2.17E-07   | NA         | 8.87E-02 |
| Vanadio (NC)              | 5.30E-04              | 1.09E-03           | NA                 | 4.47E-07           | 1.05E-01   | 2.16E-01   | NA         | 8.87E-05   | 1.86E-03   | 1.49E-04 | 3.26E-08   | 3.68E-01  | 2.95E-02 | NA         | 8.06E-07   | NA         | 9.23E-01 |
| Zinc (NC)                 | 1.96E-02              | 6.69E-02           | NA                 | 3.47E-05           | 6.53E-02   | 2.23E-01   | NA         | 1.16E-04   | 5.56E-04   | 4.46E-05 | 9.76E-09   | 1.85E-03  | 1.49E-04 | NA         | 2.86E-03   | NA         | 3.34E-01 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Nota: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 15    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 6.36E-03           | 6.36E-03            | 1.41E-04              | 5.15E-05 | 1.41E-04      | 5.15E-05 | 7.13E-03      | 5.64E-03               | 7.13E-03                    | 5.64E-03 | 2.88E-02   | 2.88E-02   |
| Arsénico (C)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 2.58E-07 | 2.36E-03      | 8.59E-04 | 2.83E-06      | 6.71E-07               | 9.43E-03                    | 2.24E-03 | 1.52E-04   | 5.08E-01   |
| Bario (NC)                | 9.55E-04           | 4.77E-03            | 2.12E-05              | 7.73E-06 | 1.06E-04      | 3.87E-05 | 4.16E-05      | 3.29E-05               | 2.08E-04                    | 1.65E-04 | 5.74E-03   | 2.87E-02   |
| Cadmio (C)                | 2.86E-06           | 5.73E-03            | 6.36E-08              | 2.32E-08 | 1.27E-04      | 4.64E-05 | 1.41E-07      | 1.12E-08               | 1.41E-04                    | 1.12E-05 | 3.43E-05   | 3.43E-02   |
| Cromo (C)                 | 9.55E-06           | 3.18E-03            | 2.12E-07              | 7.73E-08 | 7.07E-05      | 2.58E-05 | 1.37E-05      | 1.09E-05               | 4.58E-03                    | 3.62E-03 | 4.20E-04   | 1.40E-01   |
| Cobalto (NC)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 1.03E-07 | 2.36E-03      | 3.44E-04 | 7.64E-06      | 6.04E-07               | 2.55E-02                    | 2.01E-03 | 8.58E-05   | 2.86E-01   |
| Cobre (NC)                | 2.86E-04           | 2.86E-03            | 6.36E-06              | 2.32E-06 | 6.36E-05      | 2.32E-05 | 7.83E-05      | 3.71E-05               | 7.83E-04                    | 3.71E-04 | 6.60E-04   | 6.60E-03   |
| Hierro (NC)               | 1.27E-02           | 1.82E-02            | 2.83E-04              | 1.03E-04 | 4.04E-04      | 1.47E-04 | 1.76E-02      | 1.39E-02               | 2.51E-02                    | 1.99E-02 | 0.00E+00   | 0.00E+00   |
| Plomo (NC)                | 9.55E-06           | 2.65E-03            | 2.12E-07              | 7.73E-09 | 5.89E-05      | 2.15E-06 | 5.07E-06      | 2.40E-07               | 1.41E-03                    | 6.68E-05 | 1.03E-04   | 2.86E-02   |
| Manganeso (NC)            | 9.55E-04           | 1.59E-02            | 2.12E-05              | 7.73E-06 | 3.54E-04      | 1.29E-04 | 3.21E-04      | 2.54E-04               | 5.35E-03                    | 4.23E-03 | 1.04E-02   | 1.73E-01   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.41E-08              | 5.15E-09 | 7.07E-06      | 2.58E-06 | 8.49E-09      | 6.71E-09               | 4.24E-06                    | 3.35E-06 | 8.05E-06   | 8.05E-02   |
| Molibdeno (NC)            | 1.91E-04           | 3.82E-02            | 4.24E-06              | 1.55E-06 | 8.49E-04      | 3.09E-04 | 2.81E-06      | 2.22E-07               | 5.61E-04                    | 4.44E-05 | 1.17E-03   | 2.35E-01   |
| Níquel (C)                | 9.55E-06           | 7.96E-04            | 2.12E-07              | 1.55E-08 | 1.77E-05      | 1.29E-06 | 3.51E-06      | 5.55E-06               | 2.92E-04                    | 4.62E-04 | 3.43E-04   | 2.86E-02   |
| Selenio (NC)              | 2.55E-05           | 5.09E-03            | 5.66E-07              | 2.06E-07 | 1.13E-04      | 4.12E-05 | 5.66E-07      | 4.47E-08               | 1.13E-04                    | 8.94E-06 | 1.82E-04   | 3.64E-02   |
| Vanadio (NC)              | 2.86E-05           | 5.68E-03            | 6.36E-07              | 2.32E-07 | 1.26E-04      | 4.60E-05 | 4.69E-05      | 3.71E-05               | 9.31E-03                    | 7.36E-03 | 1.10E-04   | 2.19E-02   |
| Zinc (NC)                 | 1.27E-04           | 4.24E-04            | 2.83E-06              | 6.19E-07 | 9.43E-06      | 2.06E-06 | 4.16E-05      | 3.29E-05               | 1.39E-04                    | 1.10E-04 | 1.21E-02   | 4.04E-02   |



Tabla 15 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.27E-02              | 2.61E-02           | NA                 | 4.24E-05           | 1.27E-02   | 2.61E-02   | NA         | 4.24E-05   | 1.23E-02   | 9.74E-03 | 1.47E-06   | 1.23E-02  | 9.74E-03 | 1.32E-03   | 2.15E-05   | 4.30E-03   | 1.15E-01 |
| Arsénico (C)              | 1.61E-05              | 3.30E-05           | NA                 | 3.86E-09           | 5.36E-02   | 1.10E-01   | NA         | 1.29E-05   | 1.44E-06   | 3.42E-07 | 1.72E-10   | 4.81E-03  | 1.14E-03 | NA         | 7.20E-07   | NA         | 7.99E-01 |
| Bario (NC)                | 1.41E-02              | 1.92E-02           | NA                 | 2.26E-08           | 7.05E-02   | 9.62E-02   | NA         | 1.13E-07   | 4.03E-05   | 3.18E-05 | 4.80E-09   | 2.01E-04  | 1.59E-04 | 4.30E-05   | 2.43E-06   | 4.85E-03   | 2.06E-01 |
| Cadmio (C)                | 7.29E-05              | 1.49E-04           | NA                 | 2.05E-09           | 7.29E-02   | 1.49E-01   | NA         | 2.05E-06   | 3.02E-07   | 2.39E-08 | 3.60E-11   | 3.02E-04  | 2.39E-05 | NA         | 2.18E-06   | NA         | 2.63E-01 |
| Cromo (C)                 | 5.07E-04              | 4.85E-02           | NA                 | 8.59E-07           | 1.69E-01   | 1.62E+01   | NA         | 2.86E-04   | 7.04E-05   | 5.56E-05 | 8.39E-09   | 2.35E-02  | 1.85E-02 | 3.75E-04   | 2.80E-07   | 2.80E-03   | 1.65E+01 |
| Cobalto (NC)              | 8.64E-05              | 2.12E-04           | NA                 | 4.38E-07           | 2.88E-01   | 7.07E-01   | NA         | 1.46E-03   | 7.73E-06   | 6.11E-07 | 9.22E-10   | 2.58E-02  | 2.04E-03 | 6.87E-04   | 9.73E-07   | 1.62E-01   | 1.61E+00 |
| Cobre (NC)                | 1.36E-01              | 5.90E-02           | NA                 | 2.89E-06           | 1.36E+00   | 5.90E-01   | NA         | 2.89E-05   | 2.07E-04   | 9.80E-05 | 2.46E-08   | 2.07E-03  | 9.80E-04 | 1.10E-04   | 4.98E-05   | 4.98E-02   | 2.02E+00 |
| Hierro (NC)               | 5.09E-02              | 1.04E-01           | NA                 | 4.48E-06           | 7.27E-02   | 1.49E-01   | NA         | 6.40E-06   | 3.20E-02   | 2.53E-02 | 3.82E-06   | 4.57E-02  | 3.62E-02 | NA         | 2.93E-05   | NA         | 1.46E-01 |
| Plomo (NC)                | 2.14E-05              | 2.60E-04           | NA                 | 5.06E-08           | 5.95E-03   | 7.24E-02   | NA         | 1.40E-05   | 8.55E-06   | 4.05E-07 | 1.02E-09   | 2.37E-03  | 1.13E-04 | NA         | 3.31E-06   | NA         | 1.14E-01 |
| Manganeso (NC)            | 4.47E-02              | 9.16E-02           | NA                 | 1.04E-05           | 7.45E-01   | 1.53E+00   | NA         | 1.73E-04   | 5.64E-04   | 4.46E-04 | 6.73E-08   | 9.40E-03  | 7.43E-03 | 6.02E-03   | 1.49E-07   | 2.98E-03   | 2.50E+00 |
| Mercurio (NC)             | 6.31E-06              | 2.04E-05           | NA                 | 3.17E-07           | 6.31E-02   | 2.04E-01   | NA         | 3.17E-03   | 4.99E-08   | 3.95E-08 | 5.95E-12   | 2.50E-05  | 1.97E-05 | 8.88E-08   | 2.26E-06   | 7.53E-03   | 3.59E-01 |
| Molibdeno (NC)            | 1.11E-03              | 2.28E-03           | NA                 | 9.15E-08           | 2.22E-01   | 4.56E-01   | NA         | 1.83E-05   | 1.17E-05   | 9.24E-07 | 1.39E-09   | 2.34E-03  | 1.85E-04 | 5.20E-07   | 3.24E-06   | 2.70E-04   | 9.55E-01 |
| Níquel (C)                | 4.96E-04              | 8.10E-03           | NA                 | 1.61E-07           | 4.14E-02   | 6.75E-01   | NA         | 1.34E-05   | 5.20E-06   | 8.23E-06 | 6.21E-10   | 4.34E-04  | 6.86E-04 | 1.54E-04   | 4.76E-06   | 2.65E-01   | 1.01E+00 |
| Selenio (NC)              | 5.96E-05              | 1.22E-04           | NA                 | 1.93E-07           | 1.19E-02   | 2.44E-02   | NA         | 3.87E-05   | 1.33E-06   | 1.05E-07 | 1.59E-10   | 2.66E-04  | 2.10E-05 | NA         | 2.17E-07   | NA         | 7.85E-02 |
| Vanadio (NC)              | 5.30E-04              | 1.09E-03           | NA                 | 4.47E-07           | 1.05E-01   | 2.16E-01   | NA         | 8.87E-05   | 1.08E-04   | 8.56E-05 | 1.29E-08   | 2.15E-02  | 1.70E-02 | NA         | 8.06E-07   | NA         | 4.04E-01 |
| Zinc (NC)                 | 1.96E-02              | 6.69E-02           | NA                 | 3.47E-05           | 6.53E-02   | 2.23E-01   | NA         | 1.16E-04   | 3.25E-05   | 2.57E-05 | 3.87E-09   | 1.08E-04  | 8.55E-05 | NA         | 2.86E-03   | NA         | 3.30E-01 |

**Tabla 15    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 2.55E-03           | NA                    | 5.66E-05              | 2.06E-05 | NA             | NA       | 2.85E-03      | 2.25E-03               | NA                            | NA       | 1.15E-02   | NA           |
| Arsénico (C)             | 1.27E-05           | 1.91E-05              | 2.83E-07              | 1.03E-07 | 4.24E-07       | 1.55E-07 | 1.13E-06      | 2.68E-07               | 1.70E-06                      | 4.03E-07 | 6.10E-05   | 9.15E-05     |
| Bario (NC)               | 3.82E-04           | NA                    | 8.49E-06              | 3.09E-06 | NA             | NA       | 1.67E-05      | 1.32E-05               | NA                            | NA       | 2.29E-03   | NA           |
| Cadmio (C)               | 1.15E-06           | NA                    | 2.55E-08              | 9.28E-09 | NA             | NA       | 5.66E-08      | 4.47E-09               | NA                            | NA       | 1.37E-05   | NA           |
| Cromo (C)                | 3.82E-06           | NA                    | 8.49E-08              | 3.09E-08 | NA             | NA       | 5.50E-06      | 4.35E-06               | NA                            | NA       | 1.68E-04   | NA           |
| Cobalto (NC)             | 1.27E-05           | NA                    | 2.83E-07              | 4.12E-08 | NA             | NA       | 3.06E-06      | 2.42E-07               | NA                            | NA       | 3.43E-05   | NA           |
| Cobre (NC)               | 1.15E-04           | NA                    | 2.55E-06              | 9.28E-07 | NA             | NA       | 3.13E-05      | 1.49E-05               | NA                            | NA       | 2.64E-04   | NA           |
| Hierro (NC)              | 5.09E-03           | NA                    | 1.13E-04              | 4.12E-05 | NA             | NA       | 7.04E-03      | 5.56E-03               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 3.82E-06           | NA                    | 8.49E-08              | 3.09E-09 | NA             | NA       | 2.03E-06      | 9.62E-08               | NA                            | NA       | 4.12E-05   | NA           |
| Manganeso (NC)           | 3.82E-04           | NA                    | 8.49E-06              | 3.09E-06 | NA             | NA       | 1.28E-04      | 1.01E-04               | NA                            | NA       | 4.15E-03   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 5.66E-09              | 2.06E-09 | NA             | NA       | 3.39E-09      | 2.68E-09               | NA                            | NA       | 3.22E-06   | NA           |
| Molibdeno (NC)           | 7.64E-05           | NA                    | 1.70E-06              | 6.19E-07 | NA             | NA       | 1.12E-06      | 8.87E-08               | NA                            | NA       | 4.70E-04   | NA           |
| Níquel (C)               | 3.82E-06           | NA                    | 8.49E-08              | 6.19E-09 | NA             | NA       | 1.40E-06      | 2.22E-06               | NA                            | NA       | 1.37E-04   | NA           |
| Selenio (NC)             | 1.02E-05           | NA                    | 2.26E-07              | 8.25E-08 | NA             | NA       | 2.26E-07      | 1.79E-08               | NA                            | NA       | 7.29E-05   | NA           |
| Vanadio (NC)             | 1.15E-05           | NA                    | 2.55E-07              | 9.28E-08 | NA             | NA       | 1.88E-05      | 1.48E-05               | NA                            | NA       | 4.41E-05   | NA           |
| Zinc (NC)                | 5.09E-05           | NA                    | 1.13E-06              | 2.47E-07 | NA             | NA       | 1.66E-05      | 1.31E-05               | NA                            | NA       | 4.85E-03   | NA           |

**Tabla 15    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 5.10E-03              | 1.05E-02           | NA                 | 1.70E-05           | NA           | NA           | NA           | NA           | 4.93E-03   | 3.90E-03 | 5.88E-07   | NA        | NA       | NA         | 8.59E-06   | NA         | NA         |
| Arsénico (C)             | 6.43E-06              | 1.32E-05           | NA                 | 1.54E-09           | 9.64E-06     | 1.98E-05     | NA           | 2.32E-09     | 5.84E-07   | 1.39E-07 | 6.97E-11   | 8.76E-07  | 2.08E-07 | 4.68E-10   | 2.88E-07   | 4.32E-07   | 1.44E-04   |
| Bario (NC)               | 5.64E-03              | 7.70E-03           | NA                 | 9.05E-09           | NA           | NA           | NA           | NA           | 1.61E-05   | 1.27E-05 | 1.92E-09   | NA        | NA       | NA         | 9.71E-07   | NA         | NA         |
| Cadmio (C)               | 2.92E-05              | 5.98E-05           | NA                 | 8.19E-10           | NA           | NA           | NA           | NA           | 1.31E-07   | 1.04E-08 | 1.57E-11   | NA        | NA       | 1.26E-10   | 8.71E-07   | 1.57E-06   | 1.57E-06   |
| Cromo (C)                | 2.03E-04              | 1.94E-02           | NA                 | 3.44E-07           | NA           | NA           | NA           | NA           | 2.82E-05   | 2.23E-05 | 3.36E-09   | NA        | NA       | 6.02E-07   | 1.12E-07   | 4.48E-06   | 5.09E-06   |
| Cobalto (NC)             | 3.45E-05              | 8.49E-05           | NA                 | 1.75E-07           | NA           | NA           | NA           | NA           | 3.09E-06   | 2.45E-07 | 3.69E-10   | NA        | NA       | NA         | 3.89E-07   | NA         | NA         |
| Cobre (NC)               | 5.46E-02              | 2.36E-02           | NA                 | 1.15E-06           | NA           | NA           | NA           | NA           | 1.62E-04   | 7.69E-05 | 1.93E-08   | NA        | NA       | NA         | 1.99E-05   | NA         | NA         |
| Hierro (NC)              | 2.03E-02              | 4.17E-02           | NA                 | 1.79E-06           | NA           | NA           | NA           | NA           | 1.28E-02   | 1.01E-02 | 1.53E-06   | NA        | NA       | NA         | 1.17E-05   | NA         | NA         |
| Plomo (NC)               | 8.57E-06              | 1.04E-04           | NA                 | 2.02E-08           | NA           | NA           | NA           | NA           | 3.46E-06   | 1.64E-07 | 4.13E-10   | NA        | NA       | NA         | 1.32E-06   | NA         | NA         |
| Manganeso (NC)           | 1.79E-02              | 3.67E-02           | NA                 | 4.16E-06           | NA           | NA           | NA           | NA           | 2.26E-04   | 1.78E-04 | 2.69E-08   | NA        | NA       | NA         | 5.96E-08   | NA         | NA         |
| Mercurio (NC)            | 2.52E-06              | 8.18E-06           | NA                 | 1.27E-07           | NA           | NA           | NA           | NA           | 2.11E-08   | 1.67E-08 | 2.51E-12   | NA        | NA       | NA         | 9.04E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.44E-04              | 9.11E-04           | NA                 | 3.66E-08           | NA           | NA           | NA           | NA           | 4.67E-06   | 3.70E-07 | 5.57E-10   | NA        | NA       | NA         | 1.30E-06   | NA         | NA         |
| Níquel (C)               | 1.99E-04              | 3.24E-03           | NA                 | 6.44E-08           | NA           | NA           | NA           | NA           | 2.08E-06   | 3.30E-06 | 2.49E-10   | NA        | NA       | 4.23E-10   | 1.91E-06   | 7.24E-07   | 7.25E-07   |
| Selenio (NC)             | 2.38E-05              | 4.89E-05           | NA                 | 7.73E-08           | NA           | NA           | NA           | NA           | 5.47E-07   | 4.33E-08 | 6.53E-11   | NA        | NA       | NA         | 8.66E-08   | NA         | NA         |
| Vanadio (NC)             | 2.12E-04              | 4.35E-04           | NA                 | 1.79E-07           | NA           | NA           | NA           | NA           | 4.35E-05   | 3.44E-05 | 5.18E-09   | NA        | NA       | NA         | 3.22E-07   | NA         | NA         |
| Zinc (NC)                | 7.84E-03              | 2.67E-02           | NA                 | 1.39E-05           | NA           | NA           | NA           | NA           | 1.30E-05   | 1.03E-05 | 1.55E-09   | NA        | NA       | NA         | 1.14E-03   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 16    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua Para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 6.27E-03           | 6.27E-03            | 8.66E-04              | 1.04E-04 | 8.66E-04      | 1.04E-04 | 8.73E-02      | 7.00E-03               | 8.73E-02                    | 7.00E-03 | 4.17E-03   | 4.17E-03   |
| Arsénico (C)              | 1.36E-05           | 4.55E-02            | 4.33E-06              | 5.21E-07 | 1.44E-02      | 1.74E-03 | 3.46E-05      | 8.34E-07               | 1.15E-01                    | 2.78E-03 | 4.41E-05   | 1.47E-01   |
| Bario (NC)                | 1.69E-03           | 8.45E-03            | 6.49E-05              | 7.82E-06 | 3.25E-04      | 3.91E-05 | 5.10E-04      | 4.09E-05               | 2.55E-03                    | 2.05E-04 | 1.24E-03   | 6.22E-03   |
| Cadmio (C)                | 5.73E-06           | 1.15E-02            | 1.52E-07              | 1.82E-08 | 3.03E-04      | 3.65E-05 | 1.73E-06      | 1.39E-08               | 1.73E-03                    | 1.39E-05 | 3.97E-06   | 3.97E-03   |
| Cromo (C)                 | 2.45E-05           | 8.18E-03            | 8.66E-07              | 1.04E-07 | 2.89E-04      | 3.47E-05 | 1.68E-04      | 1.35E-05               | 5.61E-02                    | 4.50E-03 | 6.06E-05   | 2.02E-02   |
| Cobalto (NC)              | 1.36E-05           | 4.55E-02            | 2.16E-06              | 1.04E-07 | 7.22E-03      | 3.47E-04 | 9.35E-05      | 7.50E-07               | 3.12E-01                    | 2.50E-03 | 8.26E-06   | 2.75E-02   |
| Cobre (NC)                | 3.22E-04           | 3.58E-03            | 1.73E-05              | 2.08E-06 | 1.92E-04      | 2.32E-05 | 9.59E-04      | 4.62E-05               | 1.07E-02                    | 5.13E-04 | 6.36E-05   | 7.06E-04   |
| Hierro (NC)               | 9.55E-03           | 1.36E-02            | 8.66E-04              | 1.04E-04 | 1.24E-03      | 1.49E-04 | 2.15E-01      | 1.73E-02               | 3.08E-01                    | 2.47E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 2.18E-05           | 6.06E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 6.21E-05      | 2.99E-07               | 1.72E-02                    | 8.30E-05 | 1.49E-05   | 4.14E-03   |
| Manganeso (NC)            | 3.27E-03           | 5.45E-02            | 8.66E-05              | 1.04E-05 | 1.44E-03      | 1.74E-04 | 3.93E-03      | 3.15E-04               | 6.55E-02                    | 5.25E-03 | 2.00E-03   | 3.33E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 4.33E-08              | 5.21E-09 | 2.16E-05      | 2.61E-06 | 1.04E-07      | 8.34E-09               | 5.19E-05                    | 4.17E-06 | 1.16E-06   | 1.16E-02   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 2.16E-05              | 2.61E-06 | 4.33E-03      | 5.21E-04 | 3.44E-05      | 2.76E-07               | 6.87E-03                    | 5.51E-05 | 9.42E-05   | 1.88E-02   |
| Níquel (C)                | 3.00E-05           | 2.50E-03            | 8.66E-07              | 2.08E-08 | 7.22E-05      | 1.74E-06 | 4.29E-05      | 6.89E-06               | 3.58E-03                    | 5.74E-04 | 3.30E-05   | 2.75E-03   |
| Selenio (NC)              | 3.55E-05           | 7.09E-03            | 1.08E-06              | 1.30E-07 | 2.16E-04      | 2.61E-05 | 6.93E-06      | 5.56E-08               | 1.39E-03                    | 1.11E-05 | 2.19E-05   | 4.39E-03   |
| Vanadio (NC)              | 6.00E-05           | 1.19E-02            | 2.16E-06              | 2.61E-07 | 4.29E-04      | 5.17E-05 | 5.74E-04      | 4.61E-05               | 1.14E-01                    | 9.14E-03 | 1.59E-05   | 3.16E-03   |
| Zinc (NC)                 | 1.15E-03           | 3.82E-03            | 8.66E-06              | 6.25E-07 | 2.89E-05      | 2.08E-06 | 5.09E-04      | 4.09E-05               | 1.70E-03                    | 1.36E-04 | 1.75E-03   | 5.84E-03   |

Tabla 16 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.50E-02              | 2.77E-02           | NA                 | 1.59E-04           | 1.50E-02   | 2.77E-02   | NA         | 1.59E-04   | 2.12E-01   | 1.21E-02 | 3.71E-06   | 2.12E-01  | 1.21E-02 | 1.32E-03   | 7.42E-05   | 1.48E-02   | 3.88E-01 |
| Arsénico (C)              | 1.54E-05              | 2.83E-05           | NA                 | 1.43E-08           | 5.12E-02   | 9.44E-02   | NA         | 4.77E-05   | 2.45E-05   | 4.22E-07 | 4.31E-10   | 8.18E-02  | 1.41E-03 | NA         | 1.39E-06   | NA         | 5.56E-01 |
| Bario (NC)                | 1.43E-02              | 1.76E-02           | NA                 | 8.48E-08           | 7.17E-02   | 8.80E-02   | NA         | 4.24E-07   | 6.92E-04   | 3.96E-05 | 1.21E-08   | 3.46E-03  | 1.98E-04 | 4.31E-05   | 4.76E-06   | 9.51E-03   | 1.91E-01 |
| Cadmio (C)                | 9.48E-05              | 1.75E-04           | NA                 | 9.27E-09           | 9.48E-02   | 1.75E-01   | NA         | 9.27E-06   | 6.23E-06   | 3.57E-08 | 1.09E-10   | 6.23E-03  | 3.57E-05 | NA         | 4.25E-06   | NA         | 2.94E-01 |
| Cromo (C)                 | 5.23E-04              | 4.43E-02           | NA                 | 3.22E-06           | 1.74E-01   | 1.48E+01   | NA         | 1.07E-03   | 1.21E-03   | 6.92E-05 | 2.12E-08   | 4.02E-01  | 2.31E-02 | 3.76E-04   | 4.49E-07   | 4.49E-03   | 1.55E+01 |
| Cobalto (NC)              | 8.97E-05              | 1.98E-04           | NA                 | 1.64E-06           | 2.99E-01   | 6.59E-01   | NA         | 5.48E-03   | 1.33E-04   | 7.61E-07 | 2.33E-09   | 4.43E-01  | 2.54E-03 | 6.89E-04   | 1.90E-06   | 3.17E-01   | 2.12E+00 |
| Cobre (NC)                | 1.27E-01              | 4.78E-02           | NA                 | 1.00E-05           | 1.41E+00   | 5.31E-01   | NA         | 1.12E-04   | 3.29E-03   | 1.13E-04 | 5.77E-08   | 3.65E-02  | 1.26E-03 | 1.02E-04   | 2.72E-05   | 2.72E-02   | 2.03E+00 |
| Hierro (NC)               | 5.59E-02              | 1.03E-01           | NA                 | 1.68E-05           | 7.99E-02   | 1.47E-01   | NA         | 2.40E-05   | 5.50E-01   | 3.15E-02 | 9.64E-06   | 7.85E-01  | 4.50E-02 | NA         | 1.45E-04   | NA         | 1.18E+00 |
| Plomo (NC)                | 2.04E-05              | 2.35E-04           | NA                 | 1.89E-07           | 5.66E-03   | 6.52E-02   | NA         | 5.25E-05   | 1.46E-04   | 5.03E-07 | 2.56E-09   | 4.06E-02  | 1.40E-04 | NA         | 6.36E-06   | NA         | 1.39E-01 |
| Manganeso (NC)            | 4.54E-02              | 8.39E-02           | NA                 | 3.90E-05           | 7.57E-01   | 1.40E+00   | NA         | 6.50E-04   | 9.68E-03   | 5.55E-04 | 1.70E-07   | 1.61E-01  | 9.25E-03 | 6.03E-03   | 2.29E-06   | 4.57E-02   | 2.54E+00 |
| Mercurio (NC)             | 1.39E-05              | 3.75E-05           | NA                 | 2.07E-06           | 1.39E-01   | 3.75E-01   | NA         | 2.07E-02   | 1.49E-06   | 8.52E-08 | 2.61E-11   | 7.43E-04  | 4.26E-05 | 1.54E-07   | 4.41E-06   | 1.47E-02   | 5.63E-01 |
| Molibdeno (NC)            | 1.13E-03              | 2.09E-03           | NA                 | 3.43E-07           | 2.26E-01   | 4.17E-01   | NA         | 6.87E-05   | 2.01E-04   | 1.15E-06 | 3.52E-09   | 4.01E-02  | 2.30E-04 | 5.21E-07   | 6.34E-06   | 5.28E-04   | 7.16E-01 |
| Níquel (C)                | 5.10E-04              | 7.45E-03           | NA                 | 6.08E-07           | 4.25E-02   | 6.21E-01   | NA         | 5.06E-05   | 8.98E-05   | 1.03E-05 | 1.58E-09   | 7.49E-03  | 8.58E-04 | 1.55E-04   | 9.30E-06   | 5.16E-01   | 1.20E+00 |
| Selenio (NC)              | 5.45E-05              | 1.01E-04           | NA                 | 6.97E-07           | 1.09E-02   | 2.01E-02   | NA         | 1.39E-04   | 2.20E-05   | 1.26E-07 | 3.85E-10   | 4.39E-03  | 2.52E-05 | NA         | 3.85E-07   | NA         | 4.73E-02 |
| Vanadio (NC)              | 5.37E-04              | 9.92E-04           | NA                 | 1.67E-06           | 1.07E-01   | 1.97E-01   | NA         | 3.32E-04   | 1.86E-03   | 1.06E-04 | 3.26E-08   | 3.68E-01  | 2.11E-02 | NA         | 1.24E-06   | NA         | 8.32E-01 |
| Zinc (NC)                 | 2.00E-02              | 6.13E-02           | NA                 | 1.30E-04           | 6.66E-02   | 2.04E-01   | NA         | 4.34E-04   | 5.59E-04   | 3.20E-05 | 9.81E-09   | 1.86E-03  | 1.07E-04 | NA         | 5.62E-06   | NA         | 2.85E-01 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Nota: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 17    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.66E-03           | 3.66E-03            | 2.02E-04              | 7.36E-05 | 2.02E-04      | 7.36E-05 | 5.09E-03      | 4.03E-03               | 5.09E-03                    | 4.03E-03 | 4.17E-03   | 4.17E-03   |
| Arsénico (C)              | 7.96E-06           | 2.65E-02            | 1.01E-06              | 3.68E-07 | 3.37E-03      | 1.23E-03 | 2.02E-06      | 4.79E-07               | 6.74E-03                    | 1.60E-03 | 4.41E-05   | 1.47E-01   |
| Bario (NC)                | 9.87E-04           | 4.93E-03            | 1.52E-05              | 5.52E-06 | 7.58E-05      | 2.76E-05 | 2.97E-05      | 2.35E-05               | 1.49E-04                    | 1.18E-04 | 1.24E-03   | 6.22E-03   |
| Cadmio (C)                | 3.34E-06           | 6.68E-03            | 3.54E-08              | 1.29E-08 | 7.07E-05      | 2.58E-05 | 1.01E-07      | 7.99E-09               | 1.01E-04                    | 7.99E-06 | 3.97E-06   | 3.97E-03   |
| Cromo (C)                 | 1.43E-05           | 4.77E-03            | 2.02E-07              | 7.36E-08 | 6.74E-05      | 2.45E-05 | 9.82E-06      | 7.76E-06               | 3.27E-03                    | 2.59E-03 | 6.06E-05   | 2.02E-02   |
| Cobalto (NC)              | 7.96E-06           | 2.65E-02            | 5.05E-07              | 7.36E-08 | 1.68E-03      | 2.45E-04 | 5.46E-06      | 4.31E-07               | 1.82E-02                    | 1.44E-03 | 8.26E-06   | 2.75E-02   |
| Cobre (NC)                | 1.88E-04           | 1.88E-03            | 4.04E-06              | 1.47E-06 | 4.04E-05      | 1.47E-05 | 5.59E-05      | 2.65E-05               | 5.59E-04                    | 2.65E-04 | 6.36E-05   | 6.36E-04   |
| Hierro (NC)               | 5.57E-03           | 7.96E-03            | 2.02E-04              | 7.36E-05 | 2.89E-04      | 1.05E-04 | 1.26E-02      | 9.93E-03               | 1.79E-02                    | 1.42E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.27E-05           | 3.54E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 3.62E-06      | 1.72E-07               | 1.01E-03                    | 4.77E-05 | 1.49E-05   | 4.14E-03   |
| Manganeso (NC)            | 1.91E-03           | 3.18E-02            | 2.02E-05              | 7.36E-06 | 3.37E-04      | 1.23E-04 | 2.29E-04      | 1.81E-04               | 3.82E-03                    | 3.02E-03 | 2.00E-03   | 3.33E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.01E-08              | 3.68E-09 | 5.05E-06      | 1.84E-06 | 6.06E-09      | 4.79E-09               | 3.03E-06                    | 2.40E-06 | 1.16E-06   | 1.16E-02   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 5.05E-06              | 1.84E-06 | 1.01E-03      | 3.68E-04 | 2.00E-06      | 1.58E-07               | 4.01E-04                    | 3.17E-05 | 9.42E-05   | 1.88E-02   |
| Níquel (C)                | 1.75E-05           | 1.46E-03            | 2.02E-07              | 1.47E-08 | 1.68E-05      | 1.23E-06 | 2.51E-06      | 3.96E-06               | 2.09E-04                    | 3.30E-04 | 3.30E-05   | 2.75E-03   |
| Selenio (NC)              | 2.07E-05           | 4.14E-03            | 2.53E-07              | 9.20E-08 | 5.05E-05      | 1.84E-05 | 4.04E-07      | 3.19E-08               | 8.08E-05                    | 6.39E-06 | 2.19E-05   | 4.39E-03   |
| Vanadio (NC)              | 3.50E-05           | 6.95E-03            | 5.05E-07              | 1.84E-07 | 1.00E-04      | 3.65E-05 | 3.35E-05      | 2.65E-05               | 6.65E-03                    | 5.25E-03 | 1.59E-05   | 3.16E-03   |
| Zinc (NC)                 | 6.68E-04           | 2.23E-03            | 2.02E-06              | 4.42E-07 | 6.74E-06      | 1.47E-06 | 2.97E-05      | 2.35E-05               | 9.90E-05                    | 7.83E-05 | 1.75E-03   | 5.84E-03   |

Tabla 17 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.50E-02              | 2.77E-02           | NA                 | 1.59E-04           | 1.50E-02   | 2.77E-02   | NA         | 1.59E-04   | 1.23E-02   | 6.97E-03 | 1.47E-06   | 1.23E-02  | 6.97E-03 | 1.32E-03   | 7.42E-05   | 1.48E-02   | 9.56E-02 |
| Arsénico (C)              | 1.54E-05              | 2.83E-05           | NA                 | 1.43E-08           | 5.12E-02   | 9.44E-02   | NA         | 4.77E-05   | 1.43E-06   | 2.43E-07 | 1.71E-10   | 4.77E-03  | 8.09E-04 | NA         | 1.39E-06   | NA         | 3.38E-01 |
| Bario (NC)                | 1.43E-02              | 1.76E-02           | NA                 | 8.48E-08           | 7.17E-02   | 8.80E-02   | NA         | 4.24E-07   | 4.03E-05   | 2.28E-05 | 4.81E-09   | 2.02E-04  | 1.14E-04 | 4.31E-05   | 4.76E-06   | 9.51E-03   | 1.81E-01 |
| Cadmio (C)                | 9.48E-05              | 1.75E-04           | NA                 | 9.27E-09           | 9.48E-02   | 1.75E-01   | NA         | 9.27E-06   | 3.63E-07   | 2.05E-08 | 4.33E-11   | 3.63E-04  | 2.05E-05 | NA         | 4.25E-06   | NA         | 2.81E-01 |
| Cromo (C)                 | 5.23E-04              | 4.43E-02           | NA                 | 3.22E-06           | 1.74E-01   | 1.48E+01   | NA         | 1.07E-03   | 7.04E-05   | 3.98E-05 | 8.40E-09   | 2.35E-02  | 1.33E-02 | 3.76E-04   | 4.49E-07   | 4.49E-03   | 1.50E+01 |
| Cobalto (NC)              | 8.97E-05              | 1.98E-04           | NA                 | 1.64E-06           | 2.99E-01   | 6.59E-01   | NA         | 5.48E-03   | 7.75E-06   | 4.37E-07 | 9.24E-10   | 2.58E-02  | 1.46E-03 | 6.89E-04   | 1.90E-06   | 3.17E-01   | 1.38E+00 |
| Cobre (NC)                | 1.27E-01              | 4.78E-02           | NA                 | 1.00E-05           | 1.27E+00   | 4.78E-01   | NA         | 1.00E-04   | 1.92E-04   | 6.49E-05 | 2.29E-08   | 1.92E-03  | 6.49E-04 | 1.02E-04   | 2.72E-05   | 2.72E-02   | 1.78E+00 |
| Hierro (NC)               | 5.59E-02              | 1.03E-01           | NA                 | 1.68E-05           | 7.99E-02   | 1.47E-01   | NA         | 2.40E-05   | 3.21E-02   | 1.81E-02 | 3.82E-06   | 4.58E-02  | 2.59E-02 | NA         | 1.45E-04   | NA         | 1.12E-01 |
| Plomo (NC)                | 2.04E-05              | 2.35E-04           | NA                 | 1.89E-07           | 5.66E-03   | 6.52E-02   | NA         | 5.25E-05   | 8.53E-06   | 2.89E-07 | 1.02E-09   | 2.37E-03  | 8.03E-05 | NA         | 6.36E-06   | NA         | 8.22E-02 |
| Manganeso (NC)            | 4.54E-02              | 8.39E-02           | NA                 | 3.90E-05           | 7.57E-01   | 1.40E+00   | NA         | 6.50E-04   | 5.65E-04   | 3.19E-04 | 6.74E-08   | 9.41E-03  | 5.32E-03 | 6.03E-03   | 2.29E-06   | 4.57E-02   | 2.29E+00 |
| Mercurio (NC)             | 1.39E-05              | 3.75E-05           | NA                 | 2.07E-06           | 1.39E-01   | 3.75E-01   | NA         | 2.07E-02   | 8.67E-08   | 4.90E-08 | 1.03E-11   | 4.34E-05  | 2.45E-05 | 1.54E-07   | 4.41E-06   | 1.47E-02   | 5.62E-01 |
| Molibdeno (NC)            | 1.13E-03              | 2.09E-03           | NA                 | 3.43E-07           | 2.26E-01   | 4.17E-01   | NA         | 6.87E-05   | 1.17E-05   | 6.61E-07 | 1.40E-09   | 2.34E-03  | 1.32E-04 | 5.21E-07   | 6.34E-06   | 5.28E-04   | 6.68E-01 |
| Níquel (C)                | 5.10E-04              | 7.45E-03           | NA                 | 6.08E-07           | 4.25E-02   | 6.21E-01   | NA         | 5.06E-05   | 5.24E-06   | 5.92E-06 | 6.25E-10   | 4.37E-04  | 4.93E-04 | 1.55E-04   | 9.30E-06   | 5.16E-01   | 1.19E+00 |
| Selenio (NC)              | 5.45E-05              | 1.01E-04           | NA                 | 6.97E-07           | 1.09E-02   | 2.01E-02   | NA         | 1.39E-04   | 1.28E-06   | 7.23E-08 | 1.53E-10   | 2.56E-04  | 1.45E-05 | NA         | 3.85E-07   | NA         | 4.01E-02 |
| Vanadio (NC)              | 5.37E-04              | 9.92E-04           | NA                 | 1.67E-06           | 1.07E-01   | 1.97E-01   | NA         | 3.32E-04   | 1.08E-04   | 6.11E-05 | 1.29E-08   | 2.15E-02  | 1.21E-02 | NA         | 1.24E-06   | NA         | 3.59E-01 |
| Zinc (NC)                 | 2.00E-02              | 6.13E-02           | NA                 | 1.30E-04           | 6.66E-02   | 2.04E-01   | NA         | 4.34E-04   | 3.26E-05   | 1.84E-05 | 3.89E-09   | 1.09E-04  | 6.14E-05 | NA         | 5.62E-06   | NA         | 2.80E-01 |

**Tabla 17    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 1.46E-03           | 0.00E+00              | 8.08E-05              | 2.95E-05 | NA             | NA       | 2.04E-03      | 1.61E-03               | NA                            | NA       | 1.67E-03   | NA           |
| Arsénico (C)             | 3.18E-06           | 4.77E-06              | 4.04E-07              | 1.47E-07 | 6.06E-07       | 2.21E-07 | 8.08E-07      | 1.92E-07               | 1.21E-06                      | 2.88E-07 | 1.76E-05   | 2.64E-05     |
| Bario (NC)               | 3.95E-04           | 0.00E+00              | 6.06E-06              | 2.21E-06 | NA             | NA       | 1.19E-05      | 9.40E-06               | NA                            | NA       | 4.97E-04   | NA           |
| Cadmio (C)               | 1.34E-06           | NA                    | 1.41E-08              | 5.15E-09 | NA             | NA       | 4.04E-08      | 3.19E-09               | NA                            | NA       | 1.59E-06   | NA           |
| Cromo (C)                | 5.73E-06           | NA                    | 8.08E-08              | 2.95E-08 | NA             | NA       | 3.93E-06      | 3.11E-06               | NA                            | NA       | 2.43E-05   | NA           |
| Cobalto (NC)             | 3.18E-06           | NA                    | 2.02E-07              | 2.95E-08 | NA             | NA       | 2.18E-06      | 1.73E-07               | NA                            | NA       | 3.30E-06   | NA           |
| Cobre (NC)               | 7.51E-05           | NA                    | 1.62E-06              | 5.89E-07 | NA             | NA       | 2.24E-05      | 1.06E-05               | NA                            | NA       | 2.54E-05   | NA           |
| Hierro (NC)              | 2.23E-03           | NA                    | 8.08E-05              | 2.95E-05 | NA             | NA       | 5.03E-03      | 3.97E-03               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 5.09E-06           | NA                    | 8.08E-08              | 2.95E-09 | NA             | NA       | 1.45E-06      | 6.87E-08               | NA                            | NA       | 5.95E-06   | NA           |
| Manganeso (NC)           | 7.64E-04           | NA                    | 8.08E-06              | 2.95E-06 | NA             | NA       | 9.17E-05      | 7.25E-05               | NA                            | NA       | 7.99E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 4.04E-09              | 1.47E-09 | NA             | NA       | 2.42E-09      | 1.92E-09               | NA                            | NA       | 4.65E-07   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 2.02E-06              | 7.36E-07 | NA             | NA       | 8.02E-07      | 6.34E-08               | NA                            | NA       | 3.77E-05   | NA           |
| Níquel (C)               | 7.00E-06           | NA                    | 8.08E-08              | 5.89E-09 | NA             | NA       | 1.00E-06      | 1.58E-06               | NA                            | NA       | 1.32E-05   | NA           |
| Selenio (NC)             | 8.27E-06           | 0.00E+00              | 1.01E-07              | 3.68E-08 | NA             | NA       | 1.62E-07      | 1.28E-08               | NA                            | NA       | 8.77E-06   | NA           |
| Vanadio (NC)             | 1.40E-05           | 0.00E+00              | 2.02E-07              | 7.36E-08 | NA             | NA       | 1.34E-05      | 1.06E-05               | NA                            | NA       | 6.37E-06   | NA           |
| Zinc (NC)                | 2.67E-04           | 0.00E+00              | 8.08E-07              | 1.77E-07 | NA             | NA       | 1.19E-05      | 9.39E-06               | NA                            | NA       | 7.01E-04   | NA           |



Tabla 17 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 6.01E-03              | 1.11E-02           | NA                 | NA                 | NA           | NA           | NA           | NA           | 4.94E-03   | 2.79E-03 | 5.89E-07   | NA        | NA       | NA         | 2.97E-05   | NA         | NA         |
| Arsénico (C)             | 6.14E-06              | 1.13E-05           | NA                 | 5.73E-09           | 9.21E-06     | 1.70E-05     | NA           | 8.59E-09     | 5.73E-07   | 9.71E-08 | 6.83E-11   | 8.59E-07  | 1.46E-07 | 4.59E-10   | 5.56E-07   | 8.33E-07   | 6.16E-05   |
| Bario (NC)               | 5.73E-03              | 7.04E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.61E-05   | 9.11E-06 | 1.92E-09   | NA        | NA       | NA         | 1.90E-06   | NA         | NA         |
| Cadmio (C)               | 3.79E-05              | 7.00E-05           | NA                 | 3.71E-09           | NA           | NA           | NA           | NA           | 1.45E-07   | 8.21E-09 | 1.73E-11   | NA        | NA       | 1.40E-10   | 1.70E-06   | 3.06E-06   | 3.06E-06   |
| Cromo (C)                | 2.09E-04              | 1.77E-02           | NA                 | 1.29E-06           | NA           | NA           | NA           | NA           | 2.82E-05   | 1.59E-05 | 3.36E-09   | NA        | NA       | 6.01E-07   | 1.80E-07   | 7.19E-06   | 7.79E-06   |
| Cobalto (NC)             | 3.59E-05              | 7.91E-05           | NA                 | 6.58E-07           | NA           | NA           | NA           | NA           | 3.10E-06   | 1.75E-07 | 3.69E-10   | NA        | NA       | NA         | 7.61E-07   | NA         | NA         |
| Cobre (NC)               | 5.09E-02              | 1.91E-02           | NA                 | 4.02E-06           | NA           | NA           | NA           | NA           | 7.67E-05   | 2.60E-05 | 9.15E-09   | NA        | NA       | NA         | 1.09E-05   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.28E-02   | 7.24E-03 | 1.53E-06   | NA        | NA       | NA         | 5.81E-05   | NA         | NA         |
| Plomo (NC)               | 8.15E-06              | 9.39E-05           | NA                 | 7.56E-08           | NA           | NA           | NA           | NA           | 3.41E-06   | 1.16E-07 | 4.07E-10   | NA        | NA       | NA         | 2.55E-06   | NA         | NA         |
| Manganeso (NC)           | 1.82E-02              | 3.35E-02           | NA                 | 1.56E-05           | NA           | NA           | NA           | NA           | 2.26E-04   | 1.28E-04 | 2.69E-08   | NA        | NA       | NA         | 9.15E-07   | NA         | NA         |
| Mercurio (NC)            | 5.55E-06              | 1.50E-05           | NA                 | 8.27E-07           | NA           | NA           | NA           | NA           | 3.47E-08   | 1.96E-08 | 4.14E-12   | NA        | NA       | NA         | 1.76E-06   | NA         | NA         |
| Molibdeno (NC)           | 4.52E-04              | 8.35E-04           | NA                 | 1.37E-07           | NA           | NA           | NA           | NA           | 4.68E-06   | 2.64E-07 | 5.59E-10   | NA        | NA       | NA         | 2.54E-06   | NA         | NA         |
| Níquel (C)               | 2.04E-04              | 2.98E-03           | NA                 | 2.43E-07           | NA           | NA           | NA           | NA           | 2.10E-06   | 2.37E-06 | 2.50E-10   | NA        | NA       | 4.25E-10   | 3.72E-06   | 1.41E-06   | 1.41E-06   |
| Selenio (NC)             | 2.18E-05              | 4.03E-05           | NA                 | NA                 | NA           | NA           | NA           | NA           | 5.12E-07   | 2.89E-08 | 6.11E-11   | NA        | NA       | NA         | 1.54E-07   | NA         | NA         |
| Vanadio (NC)             | 2.15E-04              | 3.97E-04           | NA                 | NA                 | NA           | NA           | NA           | NA           | 4.33E-05   | 2.44E-05 | 5.16E-09   | NA        | NA       | NA         | 4.96E-07   | NA         | NA         |
| Zinc (NC)                | 7.99E-03              | 2.45E-02           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.30E-05   | 7.36E-06 | 1.56E-09   | NA        | NA       | NA         | 2.25E-06   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



**Tabla 18**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

| Evaluación no Cancerígena |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición<br>- Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.14E-01   | 1.23E-02 | 3.76E-06   | 2.14E-01  | 1.23E-02 | 1.33E-03   | 2.30E-04   | 4.60E-02   | 2.74E-01 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.87E-05   | 1.53E-06 | 1.56E-09   | 2.96E-01  | 5.08E-03 | NA         | 4.57E-07   | NA         | 3.01E-01 |
| Bario (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.99E-04   | 4.01E-05 | 1.23E-08   | 3.50E-03  | 2.00E-04 | 4.36E-05   | 1.40E-06   | 2.80E-03   | 6.54E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.20E-05   | 1.26E-07 | 3.86E-10   | 2.20E-02  | 1.26E-04 | NA         | 1.16E-05   | NA         | 2.21E-02 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.33E-03   | 7.65E-05 | 2.34E-08   | 4.45E-01  | 2.55E-02 | 4.16E-04   | 3.47E-06   | 3.47E-02   | 5.05E-01 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.47E-04   | 8.45E-07 | 2.59E-09   | 4.92E-01  | 2.82E-03 | 7.65E-04   | 5.20E-07   | 8.67E-02   | 5.82E-01 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.49E-02   | 1.89E-03 | 9.63E-07   | 6.10E-01  | 2.10E-02 | 1.71E-03   | 1.39E-03   | 1.39E+00   | 2.02E+00 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.55E-01   | 3.18E-02 | 9.73E-06   | 7.92E-01  | 4.54E-02 | NA         | 4.72E-04   | NA         | 8.38E-01 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.71E-04   | 9.34E-07 | 4.76E-09   | 7.54E-02  | 2.59E-04 | NA         | 3.46E-06   | NA         | 7.57E-02 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 9.77E-03   | 5.60E-04 | 1.71E-07   | 1.63E-01  | 9.33E-03 | 6.08E-03   | 7.98E-06   | 1.60E-01   | 3.38E-01 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.33E-05   | 7.60E-07 | 2.33E-10   | 6.63E-03  | 3.80E-04 | 1.38E-06   | 7.53E-07   | 2.51E-03   | 9.52E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.03E-04   | 1.17E-06 | 3.57E-09   | 4.07E-02  | 2.33E-04 | 5.28E-07   | 1.17E-06   | 9.76E-05   | 4.10E-02 |
| Níquel (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.30E-04   | 1.49E-05 | 2.29E-09   | 1.09E-02  | 1.24E-03 | 2.25E-04   | 1.48E-06   | 8.20E-02   | 9.43E-02 |
| Talio (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.14E-04   | 1.23E-06 | 3.76E-09   | 4.29E-02  | 2.46E-04 | NA         | 5.82E-07   | NA         | 4.31E-02 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.22E-03   | 1.27E-04 | 3.90E-08   | 4.40E-01  | 2.52E-02 | NA         | 9.83E-06   | NA         | 4.66E-01 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.77E-04   | 3.31E-05 | 1.01E-08   | 1.92E-03  | 1.10E-04 | NA         | 2.49E-06   | NA         | 2.03E-03 |

<sup>(a)</sup>
Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).



Tabla 19 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.25E-02   | 7.05E-03 | 1.47E-06   | 1.25E-02  | 7.05E-03 | 1.32E-03   | 2.30E-04   | 4.60E-02   | 6.68E-02 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.18E-06   | 8.77E-07 | 1.72E-10   | 1.73E-02  | 2.92E-03 | NA         | 4.57E-07   | NA         | 2.02E-02 |
| Bario (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.08E-05   | 2.30E-05 | 4.80E-09   | 2.04E-04  | 1.15E-04 | 4.30E-05   | 1.40E-06   | 2.80E-03   | 3.17E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.28E-06   | 7.26E-08 | 3.60E-11   | 1.28E-03  | 7.26E-05 | NA         | 1.16E-05   | NA         | 1.36E-03 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.79E-05   | 4.40E-05 | 8.39E-09   | 2.60E-02  | 1.47E-02 | 3.75E-04   | 3.47E-06   | 3.47E-02   | 7.56E-02 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.61E-06   | 4.86E-07 | 9.22E-10   | 2.87E-02  | 1.62E-03 | 6.87E-04   | 5.20E-07   | 8.67E-02   | 1.18E-01 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.20E-03   | 1.08E-03 | 2.46E-08   | 3.20E-02  | 1.08E-02 | 1.10E-04   | 1.39E-03   | 1.39E+00   | 1.43E+00 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.24E-02   | 1.83E-02 | 3.82E-06   | 4.62E-02  | 2.61E-02 | NA         | 4.72E-04   | NA         | 7.23E-02 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.58E-05   | 5.37E-07 | 1.02E-09   | 4.40E-03  | 1.49E-04 | NA         | 3.46E-06   | NA         | 4.55E-03 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.70E-04   | 3.22E-04 | 6.73E-08   | 9.50E-03  | 5.36E-03 | 6.02E-03   | 7.98E-06   | 1.60E-01   | 1.80E-01 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.73E-07   | 4.37E-07 | 5.95E-12   | 3.87E-04  | 2.18E-04 | 8.88E-08   | 7.53E-07   | 2.51E-03   | 3.12E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.19E-05   | 6.70E-07 | 1.39E-09   | 2.37E-03  | 1.34E-04 | 5.20E-07   | 1.17E-06   | 9.76E-05   | 2.61E-03 |
| Níquel (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.60E-06   | 8.58E-06 | 6.21E-10   | 6.33E-04  | 7.15E-04 | 1.54E-04   | 1.48E-06   | 8.20E-02   | 8.35E-02 |
| Selenio (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.25E-05   | 7.06E-07 | 1.59E-10   | 2.50E-03  | 1.41E-04 | NA         | 5.82E-07   | NA         | 2.64E-03 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.30E-04   | 7.31E-05 | 1.29E-08   | 2.57E-02  | 1.45E-02 | NA         | 9.83E-06   | NA         | 4.02E-02 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.37E-05   | 1.90E-05 | 3.87E-09   | 1.12E-04  | 6.34E-05 | NA         | 2.49E-06   | NA         | 1.76E-04 |

**Tabla 19 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)**

[illegible]

Tabla 19 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior (continuación)

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.99E-03   | 2.82E-03 | 5.96E-07   | NA        | NA       | NA         | 9.20E-05   | NA         | NA         |
| Arsénico (C)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00     | 0.00E+00     | NA           | 0.00E+00     | 2.07E-06   | 3.51E-07 | 2.47E-10   | 3.11E-06  | 5.26E-07 | 1.66E-09   | 1.83E-07   | 2.74E-07   | 3.91E-06   |
| Bario (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.63E-05   | 9.22E-06 | 1.95E-09   | NA        | NA       | NA         | 5.61E-07   | NA         | NA         |
| Cadmio (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.14E-07   | 2.90E-08 | 6.13E-11   | NA        | NA       | 4.94E-10   | 4.63E-06   | 8.33E-06   | 8.33E-06   |
| Cromo (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.11E-05   | 1.76E-05 | 3.71E-09   | NA        | NA       | 6.65E-07   | 1.39E-06   | 5.55E-05   | 5.61E-05   |
| Cobalto (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.44E-06   | 1.94E-07 | 4.11E-10   | NA        | NA       | NA         | 2.08E-07   | NA         | NA         |
| Cobre (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.28E-03   | 4.34E-04 | 1.53E-07   | NA        | NA       | NA         | 5.55E-04   | NA         | NA         |
| Hierro (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.29E-02   | 7.31E-03 | 1.54E-06   | NA        | NA       | NA         | 1.89E-04   | NA         | NA         |
| Plomo (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 6.34E-06   | 2.15E-07 | 7.56E-10   | NA        | NA       | NA         | 1.39E-06   | NA         | NA         |
| Manganeso (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.28E-04   | 1.29E-04 | 2.72E-08   | NA        | NA       | NA         | 3.19E-06   | NA         | NA         |
| Mercurio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.09E-07   | 1.75E-07 | 3.69E-11   | NA        | NA       | NA         | 3.01E-07   | NA         | NA         |
| Molibdeno (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.75E-06   | 2.68E-07 | 5.66E-10   | NA        | NA       | NA         | 4.69E-07   | NA         | NA         |
| Níquel (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.04E-06   | 3.43E-06 | 3.62E-10   | NA        | NA       | 6.16E-10   | 5.91E-07   | 2.24E-07   | 2.25E-07   |
| Selenio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.00E-06   | 2.83E-07 | 5.97E-10   | NA        | NA       | NA         | 2.33E-07   | NA         | NA         |
| Vanadio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.18E-05   | 2.93E-05 | 6.18E-09   | NA        | NA       | NA         | 3.93E-06   | NA         | NA         |
| Zinc (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.35E-05   | 7.61E-06 | 1.61E-09   | NA        | NA       | NA         | 9.96E-07   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

Tabla 20    Resumen de Cocientes de Peligro/Valores de ILCR para Todos los Receptores, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de Exposición en el Límite Superior

| Parámetro      | Poblaciones Costeras |          |            | Poblaciones Indígenas |          |            | Poblaciones Agrícolas |          |            | Poblaciones en la Línea de Cerco |          |            |
|----------------|----------------------|----------|------------|-----------------------|----------|------------|-----------------------|----------|------------|----------------------------------|----------|------------|
|                | Niños Pequeños       | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños                   | Adultos  |            |
|                | IP Total             | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total                         | IP Total | ILCR Total |
| Metales        |                      |          |            |                       |          |            |                       |          |            |                                  |          |            |
| Aluminio (NC)  | 2.64E-01             | 4.95E-02 | NA         | 4.45E-01              | 1.15E-01 | NA         | 3.88E-01              | 9.56E-02 | NA         | 2.74E-01                         | 6.68E-02 | NA         |
| Arsénico (C)   | 4.34E-01             | 2.56E-01 | 4.59E-05   | 1.11E+00              | 7.99E-01 | 1.44E-04   | 5.56E-01              | 3.38E-01 | 6.16E-05   | 3.01E-01                         | 2.02E-02 | 3.91E-06   |
| Bario (NC)     | 9.71E-02             | 9.02E-02 | NA         | 2.17E-01              | 2.06E-01 | NA         | 1.91E-01              | 1.81E-01 | NA         | 6.54E-03                         | 3.17E-03 | NA         |
| Cadmio (C)     | 1.67E-01             | 1.56E-01 | 2.08E-07   | 2.75E-01              | 2.63E-01 | 1.57E-06   | 2.94E-01              | 2.81E-01 | 3.06E-06   | 2.21E-02                         | 1.36E-03 | 8.33E-06   |
| Cromo (C)      | 9.41E+00             | 9.01E+00 | 2.13E-06   | 1.70E+01              | 1.65E+01 | 5.09E-06   | 1.55E+01              | 1.50E+01 | 7.79E-06   | 5.05E-01                         | 7.56E-02 | 5.61E-05   |
| Cobalto (NC)   | 1.14E+00             | 6.40E-01 | NA         | 2.52E+00              | 1.61E+00 | NA         | 2.12E+00              | 1.38E+00 | NA         | 5.82E-01                         | 1.18E-01 | NA         |
| Cobre (NC)     | 1.04E+00             | 8.79E-01 | NA         | 2.29E+00              | 2.02E+00 | NA         | 2.03E+00              | 1.78E+00 | NA         | 2.02E+00                         | 1.43E+00 | NA         |
| Hierro (NC)    | 9.02E-01             | 7.25E-02 | NA         | 1.35E+00              | 1.46E-01 | NA         | 1.18E+00              | 1.12E-01 | NA         | 8.38E-01                         | 7.23E-02 | NA         |
| Plomo (NC)     | 9.37E-02             | 5.03E-02 | NA         | 1.77E-01              | 1.14E-01 | NA         | 1.39E-01              | 8.22E-02 | NA         | 7.57E-02                         | 4.55E-03 | NA         |
| Manganeso (NC) | 1.41E+00             | 1.22E+00 | NA         | 2.76E+00              | 2.50E+00 | NA         | 2.54E+00              | 2.29E+00 | NA         | 3.38E-01                         | 1.80E-01 | NA         |
| Mercurio (NC)  | 5.21E-01             | 5.21E-01 | NA         | 3.60E-01              | 3.59E-01 | NA         | 5.63E-01              | 5.62E-01 | NA         | 9.52E-03                         | 3.12E-03 | NA         |
| Molibdeno (NC) | 3.90E-01             | 3.49E-01 | NA         | 1.03E+00              | 9.55E-01 | NA         | 7.16E-01              | 6.68E-01 | NA         | 4.10E-02                         | 2.61E-03 | NA         |
| Níquel (C)     | 4.40E-01             | 4.31E-01 | 9.38E-08   | 1.03E+00              | 1.01E+00 | 7.25E-07   | 1.20E+00              | 1.19E+00 | 1.41E-06   | 9.43E-02                         | 8.35E-02 | 2.25E-07   |
| Selenio (NC)   | 5.14E-02             | 4.34E-02 | NA         | 8.87E-02              | 7.85E-02 | NA         | 4.73E-02              | 4.01E-02 | NA         | 4.31E-02                         | 2.64E-03 | NA         |
| Vanadio (NC)   | 6.16E-01             | 2.11E-01 | NA         | 9.23E-01              | 4.04E-01 | NA         | 8.32E-01              | 3.59E-01 | NA         | 4.66E-01                         | 4.02E-02 | NA         |
| Zinc (NC)      | 1.73E-01             | 1.69E-01 | NA         | 3.34E-01              | 3.30E-01 | NA         | 2.85E-01              | 2.80E-01 | NA         | 2.03E-03                         | 1.76E-04 | NA         |

(a)    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:    Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

          Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



Tabla 21    Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimaciones de Tendencia Central

| Parámetro      | Agua -<br>Suministro<br>de Agua de<br>la<br>Comunidad<br>[mg/L] | Agua de<br>Mar<br>[mg/L] | Agua -<br>Área de<br>Estudio<br>Local<br>[mg/L] | Sedimentos<br>- Agua<br>Dulce<br>[mg/kg] | Sedimentos<br>- Marino/<br>Estuarino<br>[mg/kg] | Peces -<br>Agua Dulce<br>[mg/kg ww] | Peces -<br>Marino/<br>Estuarino<br>[mg/kg ww] | Suelo<br>[mg/kg] | Cultivos<br>- Fruta | Cultivos -<br>Arroz<br>[mg/kg ww] | Alimentos -<br>Carne<br>[mg/kg ww] | Alimentos -<br>Pollo<br>[mg/kg ww] | Aire -<br>Costero<br>[mg/m³] | Aire -<br>Agrícola<br>[mg/m³] | Aire -<br>Indígena<br>[mg/m³] | Aire -<br>Línea de<br>Cerca<br>[mg/m³] |
|----------------|-----------------------------------------------------------------|--------------------------|-------------------------------------------------|------------------------------------------|-------------------------------------------------|-------------------------------------|-----------------------------------------------|------------------|---------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------|-------------------------------|-------------------------------|----------------------------------------|
| Metales        |                                                                 |                          |                                                 |                                          |                                                 |                                     |                                               |                  |                     |                                   |                                    |                                    |                              |                               |                               |                                        |
| Aluminio (NC)  | 6.86E-02                                                        | 1.35E-01                 | 4.38E-01                                        | 1.61E+04                                 | 6.36E+03                                        | 9.87E+01                            | 1.93E+01                                      | 3.15E+04         | 5.24E+00            | 1.15E+01                          | 3.25E-01                           | 7.03E-01                           | 3.00E-05                     | 4.67E-05                      | 4.31E-05                      | 2.63E-05                               |
| Arsénico (C)   | 2.00E-04                                                        | 7.06E-03                 | 2.00E-04                                        | 3.38E+00                                 | 1.05E+01                                        | 4.88E-02                            | 1.98E-01                                      | 5.00E+00         | 7.68E-03            | 1.69E-02                          | 2.50E-05                           | 8.64E-05                           | 1.10E-06                     | 1.71E-06                      | 1.58E-06                      | 1.10E-06                               |
| Bario (NC)     | 1.58E-02                                                        | 1.41E-02                 | 1.65E-02                                        | 9.37E+01                                 | 5.29E+00                                        | 7.90E+00                            | 2.25E+00                                      | 6.71E+01         | 3.80E+00            | 5.54E+00                          | 2.15E-04                           | 3.31E-04                           | 3.75E-06                     | 5.84E-06                      | 5.39E-06                      | 3.29E-06                               |
| Cadmio (C)     | 4.00E-05                                                        | 2.00E-04                 | 1.10E-04                                        | 2.00E-01                                 | 2.00E-01                                        | 6.99E-02                            | 2.28E-02                                      | 5.00E-01         | 1.92E-02            | 4.22E-02                          | 1.93E-06                           | 2.19E-05                           | 3.35E-06                     | 5.22E-06                      | 4.82E-06                      | 2.93E-06                               |
| Cromo (C)      | 2.00E-04                                                        | 1.00E-03                 | 7.50E-04                                        | 3.06E+01                                 | 1.89E+01                                        | 1.30E+00                            | 4.14E-01                                      | 7.42E+01         | 8.55E-02            | 8.84E+00                          | 2.05E-03                           | 7.13E-03                           | 3.00E-07                     | 4.67E-07                      | 4.31E-07                      | 3.00E-07                               |
| Cobalto (NC)   | 2.00E-04                                                        | 1.00E-03                 | 1.00E-03                                        | 1.66E+01                                 | 1.01E+01                                        | 9.27E-02                            | 4.00E-02                                      | 1.35E+01         | 2.42E-02            | 6.37E-02                          | 6.19E-04                           | 4.96E-03                           | 1.50E-06                     | 2.34E-06                      | 2.16E-06                      | 1.31E-06                               |
| Cobre (NC)     | 3.91E-03                                                        | 1.16E-02                 | 5.61E-03                                        | 1.37E+02                                 | 8.57E+00                                        | 1.95E+00                            | 6.34E-01                                      | 2.41E+02         | 2.53E+01            | 1.08E+01                          | 5.57E-02                           | 2.81E-02                           | 3.30E-06                     | 5.14E-06                      | 4.75E-06                      | 3.30E-06                               |
| Hierro (NC)    | 8.16E-02                                                        | 2.16E-01                 | 4.40E-01                                        | 4.14E+04                                 | 2.46E+04                                        |                                     |                                               | 5.36E+04         | 1.37E+01            | 3.01E+01                          | 2.90E-02                           | 4.86E-02                           | 3.85E-05                     | 6.00E-05                      | 5.54E-05                      | 3.38E-05                               |
| Plomo (NC)     | 2.00E-04                                                        | 1.00E-03                 | 4.00E-04                                        | 1.05E+01                                 | 3.00E+00                                        | 2.45E-01                            | 4.00E-02                                      | 3.00E+01         | 9.22E-03            | 1.52E-01                          | 1.68E-05                           | 1.15E-03                           | 5.03E-06                     | 7.84E-06                      | 7.24E-06                      | 5.03E-06                               |
| Manganeso (NC) | 1.53E-02                                                        | 2.08E-02                 | 3.54E-02                                        | 7.33E+02                                 | 3.54E+02                                        | 1.76E+01                            | 6.67E+00                                      | 6.72E+02         | 8.60E+00            | 1.89E+01                          | 1.87E-01                           | 8.03E-02                           | 1.00E-07                     | 1.56E-07                      | 1.44E-07                      | 8.76E-08                               |
| Mercurio (NC)  | 2.00E-05                                                        | 2.00E-05                 | 2.00E-05                                        | 1.68E-02                                 | 1.00E-02                                        | 2.84E-02                            | 9.30E-02                                      | 1.06E-01         | 1.99E-03            | 7.13E-03                          | 3.97E-04                           | 4.35E-03                           | 3.50E-06                     | 5.45E-06                      | 5.03E-06                      | 3.07E-06                               |
| Molibdeno (NC) | 1.00E-04                                                        | 9.24E-03                 | 5.00E-04                                        | 4.66E+00                                 | 1.84E+00                                        | 1.60E-01                            | 3.52E-02                                      | 4.00E+00         | 6.14E-02            | 1.35E-01                          | 8.95E-05                           | 2.03E-04                           | 3.50E-06                     | 7.83E-06                      | 7.23E-06                      | 4.40E-06                               |
| Níquel (C)     | 2.00E-04                                                        | 1.62E-03                 | 6.00E-04                                        | 7.59E+00                                 | 6.14E+00                                        | 7.37E-01                            | 2.10E-01                                      | 5.00E+00         | 7.68E-02            | 1.35E+00                          | 2.95E-04                           | 1.00E-03                           | 7.38E-06                     | 1.15E-05                      | 1.06E-05                      | 6.50E-06                               |
| Selenio (NC)   | 2.00E-04                                                        | 1.00E-03                 | 3.50E-04                                        | 9.58E-01                                 | 2.00E-01                                        | 4.09E-01                            | 5.95E-01                                      | 2.00E+00         | 1.28E-02            | 2.81E-02                          | 3.95E-04                           | 1.88E-03                           | 3.00E-07                     | 4.67E-07                      | 4.31E-07                      | 3.00E-07                               |
| Vanadio (NC)   | 5.94E-04                                                        | 2.15E-03                 | 1.43E-03                                        | 1.07E+02                                 | 9.82E+01                                        | 2.00E-01                            | 2.30E-01                                      | 1.62E+02         | 1.24E-01            | 2.73E-01                          | 6.89E-04                           | 4.34E-03                           | 9.00E-07                     | 1.40E-06                      | 1.29E-06                      | 9.00E-07                               |
| Zinc (NC)      | 7.00E-03                                                        | 5.00E-03                 | 4.24E-03                                        | 7.94E+01                                 | 3.83E+01                                        | 2.39E+01                            | 2.61E+01                                      | 5.75E+01         | 5.61E+00            | 2.05E+01                          | 3.06E-01                           | 5.66E-01                           | 4.40E-06                     | 6.85E-06                      | 6.33E-06                      | 3.85E-06                               |

Nota: Las tendencias centrales utilizaron como modelo las concentraciones de entrada para el medio ambiental: promedio para los datos distribuidos normalmente, geomedia para datos de registro normal y media para datos no paramétricos o datos que en su mayor parte no se detectaron.

Tabla 22 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar Por El Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.74E-03           | 3.74E-03            | 1.17E-04              | 1.40E-05 | 1.17E-04      | 1.40E-05 | 8.81E-03      | 7.07E-04               | 8.81E-03                    | 7.07E-04 | 2.33E-03   | 2.33E-03   |
| Arsénico (C)              | 1.09E-05           | 3.64E-02            | 6.11E-06              | 7.36E-07 | 2.04E-02      | 2.45E-03 | 1.45E-05      | 3.50E-07               | 4.85E-02                    | 1.17E-03 | 2.40E-05   | 7.98E-02   |
| Bario (NC)                | 8.60E-04           | 4.30E-03            | 1.22E-05              | 1.47E-06 | 6.11E-05      | 7.36E-06 | 7.32E-06      | 5.88E-07               | 3.66E-05                    | 2.94E-06 | 2.72E-04   | 1.36E-03   |
| Cadmio (C)                | 2.18E-06           | 4.36E-03            | 1.73E-07              | 2.08E-08 | 3.46E-04      | 4.17E-05 | 2.77E-07      | 2.22E-09               | 2.77E-04                    | 2.22E-06 | 2.76E-06   | 2.76E-03   |
| Cromo (C)                 | 1.09E-05           | 3.64E-03            | 8.66E-07              | 1.04E-07 | 2.89E-04      | 3.47E-05 | 2.62E-05      | 2.10E-06               | 8.74E-03                    | 7.01E-04 | 5.01E-05   | 1.67E-02   |
| Cobalto (NC)              | 1.09E-05           | 3.64E-02            | 8.66E-07              | 4.17E-08 | 2.89E-03      | 1.39E-04 | 1.40E-05      | 1.12E-07               | 4.65E-02                    | 3.73E-04 | 4.84E-06   | 1.61E-02   |
| Cobre (NC)                | 2.13E-04           | 2.37E-03            | 1.01E-05              | 1.21E-06 | 1.12E-04      | 1.35E-05 | 1.19E-05      | 5.72E-07               | 1.32E-04                    | 6.35E-06 | 7.68E-05   | 8.53E-04   |
| Hierro (NC)               | 4.45E-03           | 6.36E-03            | 1.87E-04              | 2.25E-05 | 2.67E-04      | 3.22E-05 | 3.40E-02      | 2.73E-03               | 4.86E-02                    | 3.90E-03 | NA         | NA         |
| Plomo (NC)                | 1.09E-05           | 3.03E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 4.16E-06      | 2.00E-08               | 1.15E-03                    | 5.56E-06 | 4.84E-06   | 1.35E-03   |
| Manganeso (NC)            | 8.37E-04           | 1.39E-02            | 1.80E-05              | 2.17E-06 | 3.00E-04      | 3.62E-05 | 4.90E-04      | 3.93E-05               | 8.16E-03                    | 6.55E-04 | 8.08E-04   | 1.35E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 1.73E-08              | 2.08E-09 | 8.66E-06      | 1.04E-06 | 1.39E-08      | 1.11E-09               | 6.93E-06                    | 5.56E-07 | 1.13E-05   | 1.13E-01   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 8.00E-06              | 9.63E-07 | 1.60E-03      | 1.93E-04 | 2.54E-06      | 2.04E-08               | 5.09E-04                    | 4.08E-06 | 4.26E-06   | 8.52E-04   |
| Níquel (C)                | 1.09E-05           | 9.09E-04            | 1.40E-06              | 3.37E-08 | 1.17E-04      | 2.81E-06 | 8.51E-06      | 1.37E-06               | 7.09E-04                    | 1.14E-04 | 2.54E-05   | 2.12E-03   |
| Selenio (NC)              | 1.09E-05           | 2.18E-03            | 8.66E-07              | 1.04E-07 | 1.73E-04      | 2.08E-05 | 2.77E-07      | 2.22E-09               | 5.54E-05                    | 4.45E-07 | 7.20E-05   | 1.44E-02   |
| Vanadio (NC)              | 3.24E-05           | 6.43E-03            | 1.86E-06              | 2.25E-07 | 3.70E-04      | 4.45E-05 | 1.36E-04      | 1.09E-05               | 2.70E-02                    | 2.17E-03 | 2.79E-05   | 5.53E-03   |
| Zinc (NC)                 | 3.82E-04           | 1.27E-03            | 4.33E-06              | 3.13E-07 | 1.44E-05      | 1.04E-06 | 5.30E-05      | 4.26E-06               | 1.77E-04                    | 1.42E-05 | 3.16E-03   | 1.05E-02   |

Tabla 22 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 3.82E-03              | 1.03E-02           | 7.29E-06           | 3.84E-04           | 3.82E-03   | 1.03E-02   | 7.29E-06   | 3.84E-04   | 1.53E-01   | 3.50E-03 | 5.36E-07   | 1.53E-01  | 3.50E-03 | 1.90E-04   | 2.50E-06   | 5.00E-04   | 1.87E-01 |
| Arsénico (C)              | 5.60E-06              | 1.51E-05           | 5.62E-10           | 4.71E-08           | 1.87E-02   | 5.03E-02   | 1.87E-06   | 1.57E-04   | 2.42E-05   | 1.67E-07 | 8.51E-11   | 8.08E-02  | 5.56E-04 | NA         | 9.17E-08   | NA         | 3.39E-01 |
| Bario (NC)                | 2.77E-03              | 4.96E-03           | 4.83E-09           | 1.81E-07           | 1.39E-02   | 2.48E-02   | 2.41E-08   | 9.04E-07   | 3.25E-04   | 7.46E-06 | 1.14E-09   | 1.63E-03  | 3.73E-05 | 4.05E-06   | 3.13E-07   | 6.25E-04   | 4.67E-02 |
| Cadmio (C)                | 1.40E-05              | 3.77E-05           | 4.33E-11           | 1.20E-08           | 1.40E-02   | 3.77E-02   | 4.33E-08   | 1.20E-05   | 2.42E-06   | 5.56E-09 | 8.51E-12   | 2.42E-03  | 5.56E-06 | NA         | 2.79E-07   | NA         | 6.20E-02 |
| Cromo (C)                 | 6.24E-05              | 7.92E-03           | 4.60E-08           | 3.89E-06           | 2.08E-02   | 2.64E+00   | 1.53E-05   | 1.30E-03   | 3.60E-04   | 8.25E-06 | 1.26E-09   | 1.20E-01  | 2.75E-03 | 2.24E-05   | 2.50E-08   | 2.50E-04   | 2.81E+00 |
| Cobalto (NC)              | 1.76E-05              | 5.70E-05           | 1.39E-08           | 2.71E-06           | 5.88E-02   | 1.90E-01   | 4.63E-05   | 9.03E-03   | 6.54E-05   | 1.50E-07 | 2.30E-10   | 2.18E-01  | 5.00E-04 | 6.79E-05   | 1.25E-07   | 2.08E-02   | 6.00E-01 |
| Cobre (NC)                | 1.84E-02              | 9.71E-03           | 1.25E-06           | 1.54E-05           | 2.05E-01   | 1.08E-01   | 1.39E-05   | 1.71E-04   | 1.17E-03   | 1.61E-05 | 4.10E-09   | 1.30E-02  | 1.79E-04 | 7.28E-06   | 2.75E-07   | 2.75E-04   | 3.30E-01 |
| Hierro (NC)               | 1.00E-02              | 2.70E-02           | 6.52E-07           | 2.66E-05           | 1.43E-02   | 3.85E-02   | 9.31E-07   | 3.79E-05   | 2.60E-01   | 5.96E-03 | 9.12E-07   | 3.71E-01  | 8.51E-03 | NA         | 3.21E-06   | NA         | 4.39E-01 |
| Plomo (NC)                | 6.72E-06              | 1.36E-04           | 3.77E-10           | 6.29E-07           | 1.87E-03   | 3.77E-02   | 1.05E-07   | 1.75E-04   | 1.45E-04   | 2.00E-07 | 5.11E-10   | 4.04E-02  | 5.56E-05 | NA         | 4.19E-07   | NA         | 8.60E-02 |
| Manganeso (NC)            | 6.27E-03              | 1.69E-02           | 4.20E-06           | 4.38E-05           | 1.05E-01   | 2.82E-01   | 7.01E-05   | 7.31E-04   | 3.26E-03   | 7.47E-05 | 1.14E-08   | 5.43E-02  | 1.24E-03 | 4.06E-04   | 8.33E-09   | 1.67E-04   | 4.80E-01 |
| Mercurio (NC)             | 1.46E-06              | 6.38E-06           | 8.91E-09           | 2.37E-06           | 1.46E-02   | 6.38E-02   | 8.91E-05   | 2.37E-02   | 5.13E-07   | 1.18E-08 | 1.80E-12   | 2.56E-04  | 5.88E-06 | 1.06E-08   | 2.92E-07   | 9.72E-04   | 2.17E-01 |
| Molibdeno (NC)            | 4.48E-05              | 1.21E-04           | 2.01E-09           | 1.11E-07           | 8.96E-03   | 2.42E-02   | 4.02E-07   | 2.22E-05   | 1.94E-05   | 4.45E-08 | 6.81E-11   | 3.88E-03  | 8.89E-06 | 1.01E-08   | 2.92E-07   | 2.43E-05   | 4.13E-02 |
| Níquel (C)                | 5.60E-05              | 1.21E-03           | 6.63E-09           | 5.48E-07           | 4.67E-03   | 1.00E-01   | 5.52E-07   | 4.57E-05   | 2.42E-05   | 1.11E-06 | 8.51E-11   | 2.02E-03  | 9.26E-05 | 8.39E-06   | 6.15E-07   | 3.41E-02   | 1.45E-01 |
| Selenio (NC)              | 9.34E-06              | 2.52E-05           | 8.86E-09           | 1.03E-06           | 1.87E-03   | 5.03E-03   | 1.77E-06   | 2.06E-04   | 9.70E-06   | 2.22E-08 | 3.40E-11   | 1.94E-03  | 4.45E-06 | NA         | NA         | NA         | 2.59E-02 |
| Vanadio (NC)              | 9.07E-05              | 2.45E-04           | 1.55E-08           | 2.37E-06           | 1.80E-02   | 4.85E-02   | 3.07E-06   | 4.70E-04   | 7.85E-04   | 1.80E-05 | 2.76E-09   | 1.56E-01  | 3.57E-03 | NA         | 7.50E-08   | NA         | 2.68E-01 |
| Zinc (NC)                 | 4.09E-03              | 1.83E-02           | 6.87E-06           | 3.09E-04           | 1.36E-02   | 6.11E-02   | 2.29E-05   | 1.03E-03   | 2.79E-04   | 6.39E-06 | 9.78E-10   | 9.29E-04  | 2.13E-05 | NA         | 3.67E-07   | NA         | 8.88E-02 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Tabla 23    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.18E-03           | 2.18E-03            | 2.72E-05              | 9.91E-06 | 2.72E-05      | 9.91E-06 | 5.14E-04      | 4.06E-04               | 5.14E-04                    | 4.06E-04 | 2.33E-03   | 2.33E-03   |
| Arsénico (C)              | 6.36E-06           | 2.12E-02            | 1.43E-06              | 5.20E-07 | 4.75E-03      | 1.73E-03 | 8.49E-07      | 2.01E-07               | 2.83E-03                    | 6.71E-04 | 2.40E-05   | 7.98E-02   |
| Bario (NC)                | 5.02E-04           | 2.51E-03            | 2.85E-06              | 1.04E-06 | 1.43E-05      | 5.20E-06 | 4.27E-07      | 3.38E-07               | 2.14E-06                    | 1.69E-06 | 2.72E-04   | 1.36E-03   |
| Cadmio (C)                | 1.27E-06           | 2.55E-03            | 4.04E-08              | 1.47E-08 | 8.08E-05      | 2.95E-05 | 1.62E-08      | 1.28E-09               | 1.62E-05                    | 1.28E-06 | 2.76E-06   | 2.76E-03   |
| Cromo (C)                 | 6.36E-06           | 2.12E-03            | 2.02E-07              | 7.36E-08 | 6.74E-05      | 2.45E-05 | 1.53E-06      | 1.21E-06               | 5.10E-04                    | 4.03E-04 | 5.01E-05   | 1.67E-02   |
| Cobalto (NC)              | 6.36E-06           | 2.12E-02            | 2.02E-07              | 2.95E-08 | 6.74E-04      | 9.82E-05 | 8.14E-07      | 6.43E-08               | 2.71E-03                    | 2.14E-04 | 4.84E-06   | 1.61E-02   |
| Cobre (NC)                | 1.24E-04           | 1.24E-03            | 2.35E-06              | 8.55E-07 | 2.35E-05      | 8.55E-06 | 6.93E-07      | 3.29E-07               | 6.93E-06                    | 3.29E-06 | 7.68E-05   | 7.68E-04   |
| Hierro (NC)               | 2.60E-03           | 3.71E-03            | 4.37E-05              | 1.59E-05 | 6.24E-05      | 2.27E-05 | 1.99E-03      | 1.57E-03               | 2.84E-03                    | 2.24E-03 | NA         | NA         |
| Plomo (NC)                | 6.36E-06           | 1.77E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 2.42E-07      | 1.15E-08               | 6.74E-05                    | 3.19E-06 | 4.84E-06   | 1.35E-03   |
| Manganeso (NC)            | 4.88E-04           | 8.14E-03            | 4.20E-06              | 1.53E-06 | 7.01E-05      | 2.55E-05 | 2.86E-05      | 2.26E-05               | 4.76E-04                    | 3.76E-04 | 8.08E-04   | 1.35E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 4.04E-09              | 1.47E-09 | 2.02E-06      | 7.36E-07 | 8.08E-10      | 6.39E-10               | 4.04E-07                    | 3.19E-07 | 1.13E-05   | 1.13E-01   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 1.87E-06              | 6.81E-07 | 3.74E-04      | 1.36E-04 | 1.48E-07      | 1.17E-08               | 2.97E-05                    | 2.35E-06 | 4.26E-06   | 8.52E-04   |
| Níquel (C)                | 6.36E-06           | 5.30E-04            | 3.26E-07              | 2.38E-08 | 2.72E-05      | 1.98E-06 | 4.96E-07      | 7.85E-07               | 4.14E-05                    | 6.54E-05 | 2.54E-05   | 2.12E-03   |
| Selenio (NC)              | 6.36E-06           | 1.27E-03            | 2.02E-07              | 7.36E-08 | 4.04E-05      | 1.47E-05 | 1.62E-08      | 1.28E-09               | 3.23E-06                    | 2.56E-07 | 7.20E-05   | 1.44E-02   |
| Vanadio (NC)              | 1.89E-05           | 3.75E-03            | 4.35E-07              | 1.59E-07 | 8.64E-05      | 3.15E-05 | 7.94E-06      | 6.28E-06               | 1.58E-03                    | 1.25E-03 | 2.79E-05   | 5.53E-03   |
| Zinc (NC)                 | 2.23E-04           | 7.43E-04            | 1.01E-06              | 2.21E-07 | 3.37E-06      | 7.36E-07 | 3.09E-06      | 2.45E-06               | 1.03E-05                    | 8.15E-06 | 3.16E-03   | 1.05E-02   |

Tabla 23 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 3.82E-03              | 1.03E-02           | 7.29E-06           | 3.84E-04           | 3.82E-03   | 1.03E-02   | 7.29E-06   | 3.84E-04   | 8.90E-03   | 2.01E-03 | 2.12E-07   | 8.90E-03  | 2.01E-03 | 1.90E-04   | 2.50E-06   | 5.00E-04   | 3.16E-02 |
| Arsénico (C)              | 5.60E-06              | 1.51E-05           | 5.62E-10           | 4.71E-08           | 1.87E-02   | 5.03E-02   | 1.87E-06   | 1.57E-04   | 1.41E-06   | 9.58E-08 | 3.37E-11   | 4.71E-03  | 3.19E-04 | NA         | 9.17E-08   | NA         | 1.85E-01 |
| Bario (NC)                | 2.77E-03              | 4.96E-03           | 4.83E-09           | 1.81E-07           | 1.39E-02   | 2.48E-02   | 2.41E-08   | 9.04E-07   | 1.90E-05   | 4.29E-06 | 4.53E-10   | 9.49E-05  | 2.14E-05 | 4.05E-06   | 3.13E-07   | 6.25E-04   | 4.33E-02 |
| Cadmio (C)                | 1.40E-05              | 3.77E-05           | 4.33E-11           | 1.20E-08           | 1.40E-02   | 3.77E-02   | 4.33E-08   | 1.20E-05   | 1.41E-07   | 3.19E-09 | 3.37E-12   | 1.41E-04  | 3.19E-06 | NA         | 2.79E-07   | NA         | 5.73E-02 |
| Cromo (C)                 | 6.24E-05              | 7.92E-03           | 4.60E-08           | 3.89E-06           | 2.08E-02   | 2.64E+00   | 1.53E-05   | 1.30E-03   | 2.10E-05   | 4.74E-06 | 5.01E-10   | 7.00E-03  | 1.58E-03 | 2.24E-05   | 2.50E-08   | 2.50E-04   | 2.69E+00 |
| Cobalto (NC)              | 1.76E-05              | 5.70E-05           | 1.39E-08           | 2.71E-06           | 5.88E-02   | 1.90E-01   | 4.63E-05   | 9.03E-03   | 3.82E-06   | 8.62E-08 | 9.10E-11   | 1.27E-02  | 2.87E-04 | 6.79E-05   | 1.25E-07   | 2.08E-02   | 3.33E-01 |
| Cobre (NC)                | 1.84E-02              | 9.71E-03           | 1.25E-06           | 1.54E-05           | 1.84E-01   | 9.71E-02   | 1.25E-05   | 1.54E-04   | 6.82E-05   | 9.25E-06 | 1.63E-09   | 6.82E-04  | 9.25E-05 | 7.28E-06   | 2.75E-07   | 2.75E-04   | 2.85E-01 |
| Hierro (NC)               | 1.00E-02              | 2.70E-02           | 6.52E-07           | 2.66E-05           | 1.43E-02   | 3.85E-02   | 9.31E-07   | 3.79E-05   | 1.52E-02   | 3.42E-03 | 3.62E-07   | 2.17E-02  | 4.89E-03 | NA         | 3.21E-06   | NA         | 3.54E-02 |
| Plomo (NC)                | 6.72E-06              | 1.36E-04           | 3.77E-10           | 6.29E-07           | 1.87E-03   | 3.77E-02   | 1.05E-07   | 1.75E-04   | 8.49E-06   | 1.15E-07 | 2.02E-10   | 2.36E-03  | 3.19E-05 | NA         | 4.19E-07   | NA         | 4.54E-02 |
| Manganeso (NC)            | 6.27E-03              | 1.69E-02           | 4.20E-06           | 4.38E-05           | 1.05E-01   | 2.82E-01   | 7.01E-05   | 7.31E-04   | 1.90E-04   | 4.29E-05 | 4.53E-09   | 3.17E-03  | 7.15E-04 | 4.06E-04   | 8.33E-09   | 1.67E-04   | 4.14E-01 |
| Mercurio (NC)             | 1.46E-06              | 6.38E-06           | 8.91E-09           | 2.37E-06           | 1.46E-02   | 6.38E-02   | 8.91E-05   | 2.37E-02   | 2.99E-08   | 6.76E-09 | 7.13E-13   | 1.50E-05  | 3.38E-06 | 1.06E-08   | 2.92E-07   | 9.72E-04   | 2.16E-01 |
| Molibdeno (NC)            | 4.48E-05              | 1.21E-04           | 2.01E-09           | 1.11E-07           | 8.96E-03   | 2.42E-02   | 4.02E-07   | 2.22E-05   | 1.13E-06   | 2.56E-08 | 2.70E-11   | 2.26E-04  | 5.11E-06 | 1.01E-08   | 2.92E-07   | 2.43E-05   | 3.54E-02 |
| Níquel (C)                | 5.60E-05              | 1.21E-03           | 6.63E-09           | 5.48E-07           | 4.67E-03   | 1.00E-01   | 5.52E-07   | 4.57E-05   | 1.41E-06   | 6.39E-07 | 3.37E-11   | 1.18E-04  | 5.32E-05 | 8.39E-06   | 6.15E-07   | 3.41E-02   | 1.42E-01 |
| Selenio (NC)              | 9.34E-06              | 2.52E-05           | 8.86E-09           | 1.03E-06           | 1.87E-03   | 5.03E-03   | 1.77E-06   | 2.06E-04   | 5.66E-07   | 1.28E-08 | 1.35E-11   | 1.13E-04  | 2.56E-06 | NA         | NA         | NA         | 2.30E-02 |
| Vanadio (NC)              | 9.07E-05              | 2.45E-04           | 1.55E-08           | 2.37E-06           | 1.80E-02   | 4.85E-02   | 3.07E-06   | 4.70E-04   | 4.58E-05   | 1.03E-05 | 1.09E-09   | 9.09E-03  | 2.05E-03 | NA         | 7.50E-08   | NA         | 9.03E-02 |
| Zinc (NC)                 | 4.09E-03              | 1.83E-02           | 6.87E-06           | 3.09E-04           | 1.36E-02   | 6.11E-02   | 2.29E-05   | 1.03E-03   | 1.63E-05   | 3.67E-06 | 3.88E-10   | 5.42E-05  | 1.22E-05 | NA         | 3.67E-07   | NA         | 8.72E-02 |

**Tabla 23    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|------------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                        | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR - Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión              | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 8.73E-04           | NA                     | 1.09E-05              | 3.96E-06 | NA             | NA       | 2.06E-04      | 1.62E-04               | NA                            | NA       | 9.33E-04   | NA           |
| Arsénico (C)             | 2.55E-06           | 3.82E-06               | 5.70E-07              | 2.08E-07 | 8.56E-07       | 3.12E-07 | 3.39E-07      | 8.05E-08               | 2.26E-07                      | 1.21E-07 | 9.58E-06   | 1.44E-05     |
| Bario (NC)               | 2.01E-04           | NA                     | 1.14E-06              | 4.16E-07 | NA             | NA       | 1.71E-07      | 1.35E-07               | NA                            | NA       | 1.09E-04   | NA           |
| Cadmio (C)               | 5.09E-07           | NA                     | 1.62E-08              | 5.89E-09 | NA             | NA       | 6.47E-09      | 5.11E-10               | NA                            | NA       | 1.10E-06   | NA           |
| Cromo (C)                | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.12E-07      | 4.84E-07               | NA                            | NA       | 2.00E-05   | NA           |
| Cobalto (NC)             | 2.55E-06           | NA                     | 8.08E-08              | 1.18E-08 | NA             | NA       | 3.26E-07      | 2.57E-08               | NA                            | NA       | 1.94E-06   | NA           |
| Cobre (NC)               | 4.97E-05           | NA                     | 9.39E-07              | 3.42E-07 | NA             | NA       | 2.77E-07      | 1.31E-07               | NA                            | NA       | 3.07E-05   | NA           |
| Hierro (NC)              | 1.04E-03           | NA                     | 1.75E-05              | 6.37E-06 | NA             | NA       | 7.94E-04      | 6.28E-04               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-09 | NA             | NA       | 9.70E-08      | 4.60E-09               | NA                            | NA       | 1.94E-06   | NA           |
| Manganeso (NC)           | 1.95E-04           | NA                     | 1.68E-06              | 6.13E-07 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 3.23E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                     | 1.62E-09              | 5.89E-10 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 4.51E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                     | 7.47E-07              | 2.72E-07 | NA             | NA       | 5.93E-08      | 4.69E-09               | NA                            | NA       | 1.70E-06   | NA           |
| Níquel (C)               | 2.55E-06           | NA                     | 1.31E-07              | 9.52E-09 | NA             | NA       | 1.99E-07      | 3.14E-07               | NA                            | NA       | 1.02E-05   | NA           |
| Selenio (NC)             | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.47E-09      | 5.11E-10               | NA                            | NA       | 2.88E-05   | NA           |
| Vanadio (NC)             | 7.56E-06           | NA                     | 1.74E-07              | 6.34E-08 | NA             | NA       | 3.18E-06      | 2.51E-06               | NA                            | NA       | 1.11E-05   | NA           |
| Zinc (NC)                | 8.91E-05           | NA                     | 4.04E-07              | 8.84E-08 | NA             | NA       | 1.24E-06      | 9.78E-07               | NA                            | NA       | 1.26E-03   | NA           |

**Tabla 23**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 1.53E-03              | 4.12E-03           | 2.92E-06           | 1.54E-04           | NA           | NA           | NA           | NA           | 3.56E-03   | 8.04E-04 | 8.50E-08   | NA        | NA       | NA         | 9.99E-07   | NA         | NA         |
| Arsénico (C)             | 2.24E-06              | 6.04E-06           | 2.25E-10           | 1.89E-08           | 3.36E-06     | 9.06E-06     | 3.37E-10     | 2.83E-08     | 5.66E-07   | 3.83E-08 | 1.35E-11   | 8.49E-07  | 5.75E-08 | 9.06E-11   | 3.67E-08   | 5.50E-08   | 3.31E-05   |
| Bario (NC)               | 1.11E-03              | 1.99E-03           | 1.93E-09           | 7.23E-08           | NA           | NA           | NA           | NA           | 7.59E-06   | 1.72E-06 | 1.81E-10   | NA        | NA       | NA         | 1.25E-07   | NA         | NA         |
| Cadmio (C)               | 5.60E-06              | 1.51E-05           | 1.73E-11           | 4.79E-09           | NA           | NA           | NA           | NA           | 5.66E-08   | 1.28E-09 | 1.35E-12   | NA        | NA       | 1.09E-11   | 1.12E-07   | 2.01E-07   | 2.01E-07   |
| Cromo (C)                | 2.49E-05              | 3.17E-03           | 1.84E-08           | 1.56E-06           | NA           | NA           | NA           | NA           | 8.40E-06   | 1.90E-06 | 2.00E-10   | NA        | NA       | 3.59E-08   | 1.00E-08   | 4.00E-07   | 4.36E-07   |
| Cobalto (NC)             | 7.05E-06              | 2.28E-05           | 5.56E-09           | 1.08E-06           | NA           | NA           | NA           | NA           | 1.53E-06   | 3.45E-08 | 3.64E-11   | NA        | NA       | NA         | 5.00E-08   | NA         | NA         |
| Cobre (NC)               | 7.37E-03              | 3.88E-03           | 5.00E-07           | 6.14E-06           | NA           | NA           | NA           | NA           | 2.73E-05   | 3.70E-06 | 6.51E-10   | NA        | NA       | NA         | 1.10E-07   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 6.06E-03   | 1.37E-03 | 1.45E-07   | NA        | NA       | NA         | 1.28E-06   | NA         | NA         |
| Plomo (NC)               | 2.69E-06              | 5.43E-05           | 1.51E-10           | 2.52E-07           | NA           | NA           | NA           | NA           | 3.39E-06   | 4.60E-08 | 8.10E-11   | NA        | NA       | NA         | 1.68E-07   | NA         | NA         |
| Manganeso (NC)           | 2.51E-03              | 6.76E-03           | 1.68E-06           | 1.75E-05           | NA           | NA           | NA           | NA           | 7.60E-05   | 1.72E-05 | 1.81E-09   | NA        | NA       | NA         | 3.33E-09   | NA         | NA         |
| Mercurio (NC)            | 5.82E-07              | 2.55E-06           | 3.56E-09           | 9.49E-07           | NA           | NA           | NA           | NA           | 1.20E-08   | 2.70E-09 | 2.85E-13   | NA        | NA       | NA         | 1.17E-07   | NA         | NA         |
| Molibdeno (NC)           | 1.79E-05              | 4.83E-05           | 8.04E-10           | 4.44E-08           | NA           | NA           | NA           | NA           | 4.53E-07   | 1.02E-08 | 1.08E-11   | NA        | NA       | NA         | 1.17E-07   | NA         | NA         |
| Níquel (C)               | 2.24E-05              | 4.82E-04           | 2.65E-09           | 2.19E-07           | NA           | NA           | NA           | NA           | 5.66E-07   | 2.56E-07 | 1.35E-11   | NA        | NA       | 2.29E-11   | 2.46E-07   | 9.34E-08   | 9.34E-08   |
| Selenio (NC)             | 3.74E-06              | 1.01E-05           | 3.54E-09           | 4.11E-07           | NA           | NA           | NA           | NA           | 2.26E-07   | 5.11E-09 | 5.40E-12   | NA        | NA       | NA         | NA         | NA         | NA         |
| Vanadio (NC)             | 3.63E-05              | 9.78E-05           | 6.19E-09           | 9.47E-07           | NA           | NA           | NA           | NA           | 1.83E-05   | 4.14E-06 | 4.37E-10   | NA        | NA       | NA         | 3.00E-08   | NA         | NA         |
| Zinc (NC)                | 1.64E-03              | 7.34E-03           | 2.75E-06           | 1.24E-04           | NA           | NA           | NA           | NA           | 6.51E-06   | 1.47E-06 | 1.55E-10   | NA        | NA       | NA         | 1.47E-07   | NA         | NA         |

<sup>(a)</sup>
Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 24    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.39E-02           | 2.39E-02            | 1.33E-03              | 1.60E-04 | 1.33E-03      | 1.60E-04 | 7.80E-02      | 6.26E-03               | 7.80E-02                    | 6.26E-03 | 1.72E-02   | 1.72E-02   |
| Arsénico (C)              | 1.09E-05           | 3.64E-02            | 6.06E-07              | 7.30E-08 | 2.02E-03      | 2.43E-04 | 1.64E-05      | 3.94E-07               | 5.46E-02                    | 1.31E-03 | 8.51E-06   | 2.84E-02   |
| Bario (NC)                | 9.00E-04           | 4.50E-03            | 5.00E-05              | 6.02E-06 | 2.50E-04      | 3.01E-05 | 4.54E-04      | 3.65E-05               | 2.27E-03                    | 1.82E-04 | 1.38E-03   | 6.89E-03   |
| Cadmio (C)                | 6.00E-06           | 1.20E-02            | 3.33E-07              | 4.01E-08 | 6.67E-04      | 8.03E-05 | 9.70E-07      | 7.78E-09               | 9.70E-04                    | 7.78E-06 | 1.22E-05   | 1.22E-02   |
| Cromo (C)                 | 4.09E-05           | 1.36E-02            | 2.27E-06              | 2.74E-07 | 7.58E-04      | 9.12E-05 | 1.48E-04      | 1.19E-05               | 4.94E-02                    | 3.96E-03 | 2.26E-04   | 7.53E-02   |
| Cobalto (NC)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 1.46E-07 | 1.01E-02      | 4.86E-04 | 8.03E-05      | 6.44E-07               | 2.68E-01                    | 2.15E-03 | 1.62E-05   | 5.39E-02   |
| Cobre (NC)                | 3.06E-04           | 3.40E-03            | 1.70E-05              | 2.05E-06 | 1.89E-04      | 2.27E-05 | 6.62E-04      | 3.19E-05               | 7.35E-03                    | 3.54E-04 | 3.39E-04   | 3.77E-03   |
| Hierro (NC)               | 2.40E-02           | 3.43E-02            | 1.33E-03              | 1.60E-04 | 1.90E-03      | 2.29E-04 | 2.01E-01      | 1.61E-02               | 2.87E-01                    | 2.30E-02 | NA         | NA         |
| Plomo (NC)                | 2.18E-05           | 6.06E-03            | 1.21E-06              | 1.46E-08 | 3.37E-04      | 4.05E-06 | 5.08E-05      | 2.45E-07               | 1.41E-02                    | 6.79E-05 | 4.26E-05   | 1.18E-02   |
| Manganeso (NC)            | 1.93E-03           | 3.22E-02            | 1.07E-04              | 1.29E-05 | 1.79E-03      | 2.15E-04 | 3.55E-03      | 2.85E-04               | 5.92E-02                    | 4.75E-03 | 3.07E-03   | 5.12E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 6.06E-08              | 7.30E-09 | 3.03E-05      | 3.65E-06 | 8.17E-08      | 6.55E-09               | 4.08E-05                    | 3.28E-06 | 4.95E-06   | 4.95E-02   |
| Molibdeno (NC)            | 2.73E-05           | 5.45E-03            | 1.52E-06              | 1.82E-07 | 3.03E-04      | 3.65E-05 | 2.26E-05      | 1.81E-07               | 4.52E-03                    | 3.63E-05 | 2.78E-05   | 5.56E-03   |
| Níquel (C)                | 3.27E-05           | 2.73E-03            | 1.82E-06              | 4.38E-08 | 1.52E-04      | 3.65E-06 | 3.68E-05      | 5.90E-06               | 3.07E-03                    | 4.92E-04 | 1.29E-04   | 1.07E-02   |
| Selenio (NC)              | 1.91E-05           | 3.82E-03            | 1.06E-06              | 1.28E-07 | 2.12E-04      | 2.55E-05 | 4.64E-06      | 3.73E-08               | 9.29E-04                    | 7.45E-06 | 7.13E-05   | 1.43E-02   |
| Vanadio (NC)              | 7.82E-05           | 1.55E-02            | 4.35E-06              | 5.23E-07 | 8.62E-04      | 1.04E-04 | 5.17E-04      | 4.15E-05               | 1.03E-01                    | 8.24E-03 | 3.49E-05   | 6.92E-03   |
| Zinc (NC)                 | 2.31E-04           | 7.70E-04            | 1.28E-05              | 9.27E-07 | 4.28E-05      | 3.09E-06 | 3.85E-04      | 3.09E-05               | 1.28E-03                    | 1.03E-04 | 4.16E-03   | 1.39E-02   |



**Tabla 24**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá**  
**- estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.17E-03              | 1.88E-02           | NA                 | 3.07E-05           | 9.17E-03   | 1.88E-02   | NA         | 3.07E-05   | 1.53E-01   | 1.22E-02 | 2.68E-06   | 1.53E-01  | 1.22E-02 | 9.50E-04   | 1.80E-05   | 3.59E-03   | 3.24E-01 |
| Arsénico (C)              | 1.34E-05              | 2.76E-05           | NA                 | 3.77E-09           | 4.48E-02   | 9.19E-02   | NA         | 1.26E-05   | 2.42E-05   | 5.84E-07 | 4.25E-10   | 8.08E-02  | 1.95E-03 | NA         | 6.59E-07   | NA         | 3.42E-01 |
| Bario (NC)                | 6.65E-03              | 9.07E-03           | NA                 | 1.44E-08           | 3.32E-02   | 4.53E-02   | NA         | 7.22E-08   | 3.25E-04   | 2.61E-05 | 5.71E-09   | 1.63E-03  | 1.31E-04 | 2.03E-05   | 2.25E-06   | 4.49E-03   | 9.90E-02 |
| Cadmio (C)                | 3.36E-05              | 6.89E-05           | NA                 | 9.57E-10           | 3.36E-02   | 6.89E-02   | NA         | 9.57E-07   | 2.42E-06   | 1.95E-08 | 4.25E-11   | 2.42E-03  | 1.95E-05 | NA         | 2.01E-06   | NA         | 1.31E-01 |
| Cromo (C)                 | 1.50E-04              | 1.45E-02           | NA                 | 3.11E-07           | 4.99E-02   | 4.82E+00   | NA         | 1.04E-04   | 3.60E-04   | 2.89E-05 | 6.32E-09   | 1.20E-01  | 9.63E-03 | 1.12E-04   | 1.80E-07   | 1.80E-03   | 5.14E+00 |
| Cobalto (NC)              | 4.23E-05              | 1.04E-04           | NA                 | 2.16E-07           | 1.41E-01   | 3.47E-01   | NA         | 7.21E-04   | 6.54E-05   | 5.25E-07 | 1.15E-09   | 2.18E-01  | 1.75E-03 | 3.39E-04   | 8.99E-07   | 1.50E-01   | 1.37E+00 |
| Cobre (NC)                | 4.42E-02              | 1.77E-02           | NA                 | 1.23E-06           | 4.91E-01   | 1.97E-01   | NA         | 1.36E-05   | 1.17E-03   | 5.63E-05 | 2.05E-08   | 1.30E-02  | 6.26E-04 | 3.64E-05   | 1.98E-06   | 1.98E-03   | 7.19E-01 |
| Hierro (NC)               | 2.40E-02              | 4.92E-02           | NA                 | 2.12E-06           | 3.43E-02   | 7.04E-02   | NA         | 3.03E-06   | 2.60E-01   | 2.09E-02 | 4.56E-06   | 3.71E-01  | 2.98E-02 | NA         | 2.31E-05   | NA         | 7.47E-01 |
| Plomo (NC)                | 1.61E-05              | 2.48E-04           | NA                 | 5.02E-08           | 4.48E-03   | 6.89E-02   | NA         | 1.40E-05   | 1.45E-04   | 7.00E-07 | 2.55E-09   | 4.04E-02  | 1.95E-04 | NA         | 3.02E-06   | NA         | 1.46E-01 |
| Manganeso (NC)            | 1.51E-02              | 3.09E-02           | NA                 | 3.50E-06           | 2.51E-01   | 5.14E-01   | NA         | 5.84E-05   | 3.26E-03   | 2.61E-04 | 5.71E-08   | 5.43E-02  | 4.36E-03 | 2.03E-03   | 5.99E-08   | 1.20E-03   | 9.76E-01 |
| Mercurio (NC)             | 3.49E-06              | 1.17E-05           | NA                 | 1.90E-07           | 3.49E-02   | 1.17E-01   | NA         | 1.90E-03   | 5.13E-07   | 4.11E-08 | 9.00E-12   | 2.56E-04  | 2.06E-05 | 5.32E-08   | 2.10E-06   | 6.99E-03   | 2.11E-01 |
| Molibdeno (NC)            | 1.08E-04              | 2.21E-04           | NA                 | 8.86E-09           | 2.15E-02   | 4.41E-02   | NA         | 1.77E-06   | 1.94E-05   | 1.56E-07 | 3.40E-10   | 3.88E-03  | 3.11E-05 | 5.03E-08   | 3.01E-06   | 2.51E-04   | 8.57E-02 |
| Níquel (C)                | 1.34E-04              | 2.20E-03           | NA                 | 4.38E-08           | 1.12E-02   | 1.83E-01   | NA         | 3.65E-06   | 2.42E-05   | 3.89E-06 | 4.25E-10   | 2.02E-03  | 3.24E-04 | 4.19E-05   | 4.42E-06   | 2.46E-01   | 4.60E-01 |
| Selenio (NC)              | 2.24E-05              | 4.60E-05           | NA                 | 8.21E-08           | 4.48E-03   | 9.19E-03   | NA         | 1.64E-05   | 9.70E-06   | 7.78E-08 | 1.70E-10   | 1.94E-03  | 1.56E-05 | NA         | 1.80E-07   | NA         | 3.49E-02 |
| Vanadio (NC)              | 2.18E-04              | 4.47E-04           | NA                 | 1.89E-07           | 4.32E-02   | 8.86E-02   | NA         | 3.75E-05   | 7.85E-04   | 6.30E-05 | 1.38E-08   | 1.56E-01  | 1.25E-02 | NA         | 5.39E-07   | NA         | 4.34E-01 |
| Zinc (NC)                 | 9.82E-03              | 3.35E-02           | NA                 | 2.47E-05           | 3.27E-02   | 1.12E-01   | NA         | 8.23E-05   | 2.79E-04   | 2.24E-05 | 4.89E-09   | 9.29E-04  | 7.46E-05 | NA         | 2.64E-06   | NA         | 1.62E-01 |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 25    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 1.39E-02           | 1.39E-02            | 3.09E-04              | 1.13E-04 | 3.09E-04      | 1.13E-04 | 4.55E-03      | 3.60E-03               | 4.55E-03                    | 3.60E-03 | 1.72E-02   | 1.72E-02   |
| Arsénico (C)              | 6.36E-06           | 2.12E-02            | 1.41E-07              | 5.15E-08 | 4.71E-04      | 1.72E-04 | 9.55E-07      | 2.27E-07               | 3.18E-03                    | 7.55E-04 | 8.51E-06   | 2.84E-02   |
| Bario (NC)                | 5.25E-04           | 2.62E-03            | 1.17E-05              | 4.25E-06 | 5.83E-05      | 2.13E-05 | 2.65E-05      | 2.10E-05               | 1.33E-04                    | 1.05E-04 | 1.38E-03   | 6.89E-03   |
| Cadmio (C)                | 3.50E-06           | 7.00E-03            | 7.78E-08              | 2.83E-08 | 1.56E-04      | 5.67E-05 | 5.66E-08      | 4.47E-09               | 5.66E-05                    | 4.47E-06 | 1.22E-05   | 1.22E-02   |
| Cromo (C)                 | 2.39E-05           | 7.96E-03            | 5.30E-07              | 1.93E-07 | 1.77E-04      | 6.44E-05 | 8.65E-06      | 6.83E-06               | 2.88E-03                    | 2.28E-03 | 2.26E-04   | 7.53E-02   |
| Cobalto (NC)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 1.03E-07 | 2.36E-03      | 3.44E-04 | 4.68E-06      | 3.70E-07               | 1.56E-02                    | 1.23E-03 | 1.62E-05   | 5.39E-02   |
| Cobre (NC)                | 1.78E-04           | 1.78E-03            | 3.97E-06              | 1.45E-06 | 3.97E-05      | 1.45E-05 | 3.86E-05      | 1.83E-05               | 3.86E-04                    | 1.83E-04 | 3.39E-04   | 3.39E-03   |
| Hierro (NC)               | 1.40E-02           | 2.00E-02            | 3.11E-04              | 1.13E-04 | 4.44E-04      | 1.62E-04 | 1.17E-02      | 9.26E-03               | 1.67E-02                    | 1.32E-02 | 0.00E+00   | 0.00E+00   |
| Plomo (NC)                | 1.27E-05           | 3.54E-03            | 2.83E-07              | 1.03E-08 | 7.86E-05      | 2.86E-06 | 2.96E-06      | 1.41E-07               | 8.23E-04                    | 3.91E-05 | 4.26E-05   | 1.18E-02   |
| Manganeso (NC)            | 1.13E-03           | 1.88E-02            | 2.51E-05              | 9.13E-06 | 4.18E-04      | 1.52E-04 | 2.07E-04      | 1.64E-04               | 3.45E-03                    | 2.73E-03 | 3.07E-03   | 5.12E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.41E-08              | 5.15E-09 | 7.07E-06      | 2.58E-06 | 4.76E-09      | 3.77E-09               | 2.38E-06                    | 1.88E-06 | 4.95E-06   | 4.95E-02   |
| Molibdeno (NC)            | 1.59E-05           | 3.18E-03            | 3.54E-07              | 1.29E-07 | 7.07E-05      | 2.58E-05 | 1.32E-06      | 1.04E-07               | 2.64E-04                    | 2.08E-05 | 2.78E-05   | 5.56E-03   |
| Níquel (C)                | 1.91E-05           | 1.59E-03            | 4.24E-07              | 3.09E-08 | 3.54E-05      | 2.58E-06 | 2.15E-06      | 3.39E-06               | 1.79E-04                    | 2.83E-04 | 1.29E-04   | 1.07E-02   |
| Selenio (NC)              | 1.11E-05           | 2.23E-03            | 2.48E-07              | 9.02E-08 | 4.95E-05      | 1.80E-05 | 2.71E-07      | 2.14E-08               | 5.42E-05                    | 4.28E-06 | 7.13E-05   | 1.43E-02   |
| Vanadio (NC)              | 4.56E-05           | 9.05E-03            | 1.01E-06              | 3.70E-07 | 2.01E-04      | 7.33E-05 | 3.02E-05      | 2.39E-05               | 5.99E-03                    | 4.73E-03 | 3.49E-05   | 6.92E-03   |
| Zinc (NC)                 | 1.35E-04           | 4.49E-04            | 3.00E-06              | 6.55E-07 | 9.99E-06      | 2.18E-06 | 2.25E-05      | 1.78E-05               | 7.49E-05                    | 5.92E-05 | 4.16E-03   | 1.39E-02   |

**Tabla 25**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos Del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.17E-03              | 1.88E-02           | NA                 | 3.07E-05           | 9.17E-03   | 1.88E-02   | NA         | 3.07E-05   | 8.90E-03   | 7.04E-03 | 1.06E-06   | 8.90E-03  | 7.04E-03 | 9.50E-04   | 1.80E-05   | 3.59E-03   | 8.82E-02 |
| Arsénico (C)              | 1.34E-05              | 2.76E-05           | NA                 | 3.77E-09           | 4.48E-02   | 9.19E-02   | NA         | 1.26E-05   | 1.41E-06   | 3.35E-07 | 1.69E-10   | 4.71E-03  | 1.12E-03 | NA         | 6.59E-07   | NA         | 1.97E-01 |
| Bario (NC)                | 6.65E-03              | 9.07E-03           | NA                 | 1.44E-08           | 3.32E-02   | 4.53E-02   | NA         | 7.22E-08   | 1.90E-05   | 1.50E-05 | 2.26E-09   | 9.49E-05  | 7.50E-05 | 2.03E-05   | 2.25E-06   | 4.49E-03   | 9.31E-02 |
| Cadmio (C)                | 3.36E-05              | 6.89E-05           | NA                 | 9.57E-10           | 3.36E-02   | 6.89E-02   | NA         | 9.57E-07   | 1.41E-07   | 1.12E-08 | 1.69E-11   | 1.41E-04  | 1.12E-05 | NA         | 2.01E-06   | NA         | 1.22E-01 |
| Cromo (C)                 | 1.50E-04              | 1.45E-02           | NA                 | 3.11E-07           | 4.99E-02   | 4.82E+00   | NA         | 1.04E-04   | 2.10E-05   | 1.66E-05 | 2.50E-09   | 7.00E-03  | 5.53E-03 | 1.12E-04   | 1.80E-07   | 1.80E-03   | 4.97E+00 |
| Cobalto (NC)              | 4.23E-05              | 1.04E-04           | NA                 | 2.16E-07           | 1.41E-01   | 3.47E-01   | NA         | 7.21E-04   | 3.82E-06   | 3.02E-07 | 4.55E-10   | 1.27E-02  | 1.01E-03 | 3.39E-04   | 8.99E-07   | 1.50E-01   | 8.32E-01 |
| Cobre (NC)                | 4.42E-02              | 1.77E-02           | NA                 | 1.23E-06           | 4.42E-01   | 1.77E-01   | NA         | 1.23E-05   | 6.82E-05   | 3.24E-05 | 8.14E-09   | 6.82E-04  | 3.24E-04 | 3.64E-05   | 1.98E-06   | 1.98E-03   | 6.28E-01 |
| Hierro (NC)               | 2.40E-02              | 4.92E-02           | NA                 | 2.12E-06           | 3.43E-02   | 7.04E-02   | NA         | 3.03E-06   | 1.52E-02   | 1.20E-02 | 1.81E-06   | 2.17E-02  | 1.71E-02 | NA         | 2.31E-05   | NA         | 8.93E-02 |
| Plomo (NC)                | 1.61E-05              | 2.48E-04           | NA                 | 5.02E-08           | 4.48E-03   | 6.89E-02   | NA         | 1.40E-05   | 8.49E-06   | 4.03E-07 | 1.01E-09   | 2.36E-03  | 1.12E-04 | NA         | 3.02E-06   | NA         | 9.22E-02 |
| Manganeso (NC)            | 1.51E-02              | 3.09E-02           | NA                 | 3.50E-06           | 2.51E-01   | 5.14E-01   | NA         | 5.84E-05   | 1.90E-04   | 1.50E-04 | 2.27E-08   | 3.17E-03  | 2.50E-03 | 2.03E-03   | 5.99E-08   | 1.20E-03   | 8.51E-01 |
| Mercurio (NC)             | 3.49E-06              | 1.17E-05           | NA                 | 1.90E-07           | 3.49E-02   | 1.17E-01   | NA         | 1.90E-03   | 2.99E-08   | 2.36E-08 | 3.57E-12   | 1.50E-05  | 1.18E-05 | 5.32E-08   | 2.10E-06   | 6.99E-03   | 2.10E-01 |
| Molibdeno (NC)            | 1.08E-04              | 2.21E-04           | NA                 | 8.86E-09           | 2.15E-02   | 4.41E-02   | NA         | 1.77E-06   | 1.13E-06   | 8.94E-08 | 1.35E-10   | 2.26E-04  | 1.79E-05 | 5.03E-08   | 3.01E-06   | 2.51E-04   | 7.53E-02 |
| Níquel (C)                | 1.34E-04              | 2.20E-03           | NA                 | 4.38E-08           | 1.12E-02   | 1.83E-01   | NA         | 3.65E-06   | 1.41E-06   | 2.24E-06 | 1.69E-10   | 1.18E-04  | 1.86E-04 | 4.19E-05   | 4.42E-06   | 2.46E-01   | 4.53E-01 |
| Selenio (NC)              | 2.24E-05              | 4.60E-05           | NA                 | 8.21E-08           | 4.48E-03   | 9.19E-03   | NA         | 1.64E-05   | 5.66E-07   | 4.47E-08 | 6.75E-11   | 1.13E-04  | 8.94E-06 | NA         | NA         | NA         | 3.04E-02 |
| Vanadio (NC)              | 2.18E-04              | 4.47E-04           | NA                 | 1.89E-07           | 4.32E-02   | 8.86E-02   | NA         | 3.75E-05   | 4.58E-05   | 3.62E-05 | 5.46E-09   | 9.09E-03  | 7.19E-03 | NA         | 5.39E-07   | NA         | 1.75E-01 |
| Zinc (NC)                 | 9.82E-03              | 3.35E-02           | NA                 | 2.47E-05           | 3.27E-02   | 1.12E-01   | NA         | 8.23E-05   | 1.63E-05   | 1.29E-05 | 1.94E-09   | 5.42E-05  | 4.29E-05 | NA         | 2.64E-06   | NA         | 1.59E-01 |

**Tabla 25    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 8.73E-04           | NA                    | 1.24E-04              | 4.51E-05 | NA             | NA       | 1.82E-03      | 1.44E-03               | NA                            | NA       | 6.88E-03   | NA           |
| Arsénico (C)             | 2.55E-06           | 3.82E-06              | 5.66E-08              | 2.06E-08 | 8.49E-08       | 3.09E-08 | 3.82E-07      | 9.06E-08               | 5.73E-07                      | 1.36E-07 | 3.40E-06   | 5.10E-06     |
| Bario (NC)               | 2.01E-04           | NA                    | 4.67E-06              | 1.70E-06 | NA             | NA       | 1.06E-05      | 8.38E-06               | NA                            | NA       | 5.51E-04   | NA           |
| Cadmio (C)               | 5.09E-07           | NA                    | 3.11E-08              | 1.13E-08 | NA             | NA       | 2.26E-08      | 1.79E-09               | NA                            | NA       | 4.88E-06   | NA           |
| Cromo (C)                | 2.55E-06           | NA                    | 2.12E-07              | 7.73E-08 | NA             | NA       | 3.46E-06      | 2.73E-06               | NA                            | NA       | 9.03E-05   | NA           |
| Cobalto (NC)             | 2.55E-06           | NA                    | 2.83E-07              | 4.12E-08 | NA             | NA       | 1.87E-06      | 1.48E-07               | NA                            | NA       | 6.47E-06   | NA           |
| Cobre (NC)               | 4.97E-05           | NA                    | 1.59E-06              | 5.78E-07 | NA             | NA       | 1.54E-05      | 7.33E-06               | NA                            | NA       | 1.36E-04   | NA           |
| Hierro (NC)              | 1.04E-03           | NA                    | 1.24E-04              | 4.53E-05 | NA             | NA       | 4.68E-03      | 3.70E-03               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 2.55E-06           | NA                    | 1.13E-07              | 4.12E-09 | NA             | NA       | 1.19E-06      | 5.62E-08               | NA                            | NA       | 1.71E-05   | NA           |
| Manganeso (NC)           | 1.95E-04           | NA                    | 1.00E-05              | 3.65E-06 | NA             | NA       | 8.29E-05      | 6.55E-05               | NA                            | NA       | 1.23E-03   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 5.66E-09              | 2.06E-09 | NA             | NA       | 1.91E-09      | 1.51E-09               | NA                            | NA       | 1.98E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 1.41E-07              | 5.15E-08 | NA             | NA       | 5.27E-07      | 4.17E-08               | NA                            | NA       | 1.11E-05   | NA           |
| Níquel (C)               | 2.55E-06           | NA                    | 1.70E-07              | 1.24E-08 | NA             | NA       | 8.59E-07      | 1.36E-06               | NA                            | NA       | 5.14E-05   | NA           |
| Selenio (NC)             | 2.55E-06           | NA                    | 9.90E-08              | 3.61E-08 | NA             | NA       | 1.08E-07      | 8.57E-09               | NA                            | NA       | 2.85E-05   | NA           |
| Vanadio (NC)             | 7.56E-06           | NA                    | 4.06E-07              | 1.48E-07 | NA             | NA       | 1.21E-05      | 9.54E-06               | NA                            | NA       | 1.40E-05   | NA           |
| Zinc (NC)                | 8.91E-05           | NA                    | 1.20E-06              | 2.62E-07 | NA             | NA       | 8.99E-06      | 7.10E-06               | NA                            | NA       | 1.66E-03   | NA           |

**Tabla 25    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 3.67E-03              | 7.52E-03           | NA                 | 1.23E-05           | NA           | NA           | NA           | NA           | 3.56E-03   | 2.82E-03 | 4.25E-07   | NA        | NA       | NA         | 7.18E-06   | NA         | NA         |
| Arsénico (C)             | 5.38E-06              | 1.10E-05           | NA                 | 1.51E-09           | 8.07E-06     | 1.65E-05     | NA           | 2.26E-09     | 5.66E-07   | 1.34E-07 | 6.75E-11   | 8.49E-07  | 2.01E-07 | 4.53E-10   | 2.64E-07   | 3.95E-07   | 3.58E-05   |
| Bario (NC)               | 2.66E-03              | 3.63E-03           | NA                 | 5.77E-09           | NA           | NA           | NA           | NA           | 7.59E-06   | 6.00E-06 | 9.06E-10   | NA        | NA       | NA         | 8.99E-07   | NA         | NA         |
| Cadmio (C)               | 1.34E-05              | 2.76E-05           | NA                 | 3.83E-10           | NA           | NA           | NA           | NA           | 5.66E-08   | 4.47E-09 | 6.75E-12   | NA        | NA       | 5.43E-11   | 8.03E-07   | 1.45E-06   | 1.45E-06   |
| Cromo (C)                | 5.99E-05              | 5.78E-03           | NA                 | 1.24E-07           | NA           | NA           | NA           | NA           | 8.40E-06   | 6.64E-06 | 1.00E-09   | NA        | NA       | 1.79E-07   | 7.19E-08   | 2.88E-06   | 3.06E-06   |
| Cobalto (NC)             | 1.69E-05              | 4.17E-05           | NA                 | 8.65E-08           | NA           | NA           | NA           | NA           | 1.53E-06   | 1.21E-07 | 1.82E-10   | NA        | NA       | NA         | 3.60E-07   | NA         | NA         |
| Cobre (NC)               | 1.77E-02              | 7.09E-03           | NA                 | 4.91E-07           | NA           | NA           | NA           | NA           | 2.73E-05   | 1.29E-05 | 3.25E-09   | NA        | NA       | NA         | 7.91E-07   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 6.06E-03   | 4.79E-03 | 7.23E-07   | NA        | NA       | NA         | 9.23E-06   | NA         | NA         |
| Plomo (NC)               | 6.45E-06              | 9.93E-05           | NA                 | 2.01E-08           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.61E-07 | 4.05E-10   | NA        | NA       | NA         | 1.21E-06   | NA         | NA         |
| Manganeso (NC)           | 6.02E-03              | 1.23E-02           | NA                 | 1.40E-06           | NA           | NA           | NA           | NA           | 7.60E-05   | 6.01E-05 | 9.06E-09   | NA        | NA       | NA         | 2.40E-08   | NA         | NA         |
| Mercurio (NC)            | 1.40E-06              | 4.66E-06           | NA                 | 7.58E-08           | NA           | NA           | NA           | NA           | 1.20E-08   | 9.46E-09 | 1.43E-12   | NA        | NA       | NA         | 8.39E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.30E-05              | 8.82E-05           | NA                 | 3.54E-09           | NA           | NA           | NA           | NA           | 4.53E-07   | 3.58E-08 | 5.40E-11   | NA        | NA       | NA         | 1.20E-06   | NA         | NA         |
| Níquel (C)               | 5.38E-05              | 8.80E-04           | NA                 | 1.75E-08           | NA           | NA           | NA           | NA           | 5.66E-07   | 8.94E-07 | 6.75E-11   | NA        | NA       | 1.15E-10   | 1.77E-06   | 6.72E-07   | 6.72E-07   |
| Selenio (NC)             | 8.96E-06              | 1.84E-05           | NA                 | 3.28E-08           | NA           | NA           | NA           | NA           | 2.26E-07   | 1.79E-08 | 2.70E-11   | NA        | NA       | NA         | 7.19E-08   | NA         | NA         |
| Vanadio (NC)             | 8.71E-05              | 1.79E-04           | NA                 | 7.56E-08           | NA           | NA           | NA           | NA           | 1.83E-05   | 1.45E-05 | 2.19E-09   | NA        | NA       | NA         | 2.16E-07   | NA         | NA         |
| Zinc (NC)                | 3.93E-03              | 1.34E-02           | NA                 | 9.88E-06           | NA           | NA           | NA           | NA           | 6.51E-06   | 5.14E-06 | 7.76E-10   | NA        | NA       | NA         | 1.05E-06   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 26    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.74E-03           | 3.74E-03            | 9.47E-04              | 1.14E-04 | 9.47E-04      | 1.14E-04 | 5.57E-02      | 4.47E-03               | 5.57E-02                    | 4.47E-03 | 2.49E-03   | 2.49E-03   |
| Arsénico (C)              | 1.09E-05           | 3.64E-02            | 4.33E-07              | 5.21E-08 | 1.44E-03      | 1.74E-04 | 1.17E-05      | 2.82E-07               | 3.90E-02                    | 9.38E-04 | 1.23E-06   | 4.10E-03   |
| Bario (NC)                | 8.60E-04           | 4.30E-03            | 3.57E-05              | 4.30E-06 | 1.79E-04      | 2.15E-05 | 3.25E-04      | 2.61E-05               | 1.62E-03                    | 1.30E-04 | 1.99E-04   | 9.95E-04   |
| Cadmio (C)                | 2.18E-06           | 4.36E-03            | 2.38E-07              | 2.87E-08 | 4.76E-04      | 5.73E-05 | 6.93E-07      | 5.56E-09               | 6.93E-04                    | 5.56E-06 | 1.76E-06   | 1.76E-03   |
| Cromo (C)                 | 1.09E-05           | 3.64E-03            | 1.62E-06              | 1.95E-07 | 5.41E-04      | 6.52E-05 | 1.06E-04      | 8.49E-06               | 3.53E-02                    | 2.83E-03 | 3.26E-05   | 1.09E-02   |
| Cobalto (NC)              | 1.09E-05           | 3.64E-02            | 2.16E-06              | 1.04E-07 | 7.22E-03      | 3.47E-04 | 5.73E-05      | 4.60E-07               | 1.91E-01                    | 1.53E-03 | 2.33E-06   | 7.78E-03   |
| Cobre (NC)                | 2.13E-04           | 2.37E-03            | 1.21E-05              | 1.46E-06 | 1.35E-04      | 1.62E-05 | 4.73E-04      | 2.28E-05               | 5.25E-03                    | 2.53E-04 | 4.90E-05   | 5.44E-04   |
| Hierro (NC)               | 4.45E-03           | 6.36E-03            | 9.52E-04              | 1.15E-04 | 1.36E-03      | 1.64E-04 | 1.43E-01      | 1.15E-02               | 2.05E-01                    | 1.64E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.09E-05           | 3.03E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 3.63E-05      | 1.75E-07               | 1.01E-02                    | 4.85E-05 | 6.16E-06   | 1.71E-03   |
| Manganeso (NC)            | 8.37E-04           | 1.39E-02            | 7.67E-05              | 9.23E-06 | 1.28E-03      | 1.54E-04 | 2.54E-03      | 2.04E-04               | 4.23E-02                    | 3.39E-03 | 4.44E-04   | 7.39E-03   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 4.33E-08              | 5.21E-09 | 2.16E-05      | 2.61E-06 | 5.83E-08      | 4.68E-09               | 2.92E-05                    | 2.34E-06 | 7.15E-07   | 7.15E-03   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 1.08E-06              | 1.30E-07 | 2.16E-04      | 2.61E-05 | 1.61E-05      | 1.30E-07               | 3.23E-03                    | 2.59E-05 | 4.02E-06   | 8.04E-04   |
| Níquel (C)                | 1.09E-05           | 9.09E-04            | 1.30E-06              | 3.13E-08 | 1.08E-04      | 2.61E-06 | 2.63E-05      | 4.22E-06               | 2.19E-03                    | 3.51E-04 | 1.86E-05   | 1.55E-03   |
| Talio (NC)                | 1.09E-05           | 2.18E-03            | 7.58E-07              | 9.12E-08 | 1.52E-04      | 1.82E-05 | 3.32E-06      | 2.66E-08               | 6.63E-04                    | 5.32E-06 | 1.03E-05   | 2.06E-03   |
| Vanadio (NC)              | 3.24E-05           | 6.43E-03            | 3.10E-06              | 3.74E-07 | 6.16E-04      | 7.41E-05 | 3.69E-04      | 2.96E-05               | 7.33E-02                    | 5.88E-03 | 5.04E-06   | 1.00E-03   |
| Zinc (NC)                 | 3.82E-04           | 1.27E-03            | 9.17E-06              | 6.62E-07 | 3.06E-05      | 2.21E-06 | 2.75E-04      | 2.21E-05               | 9.17E-04                    | 7.36E-05 | 6.01E-04   | 2.00E-03   |

**Tabla 26**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá**
**- Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.30E-03              | 1.72E-02           | NA                 | 1.15E-04           | 9.30E-03   | 1.72E-02   | NA         | 1.15E-04   | 1.53E-01   | 8.75E-03 | 2.68E-06   | 1.53E-01  | 8.75E-03 | 9.50E-04   | 1.95E-05   | 3.89E-03   | 2.60E-01 |
| Arsénico (C)              | 1.36E-05              | 2.52E-05           | NA                 | 1.41E-08           | 4.54E-02   | 8.39E-02   | NA         | 4.70E-05   | 2.42E-05   | 4.17E-07 | 4.25E-10   | 8.08E-02  | 1.39E-03 | NA         | 7.14E-07   | NA         | 2.94E-01 |
| Bario (NC)                | 6.74E-03              | 8.27E-03           | NA                 | 5.40E-08           | 3.37E-02   | 4.14E-02   | NA         | 2.70E-07   | 3.25E-04   | 1.87E-05 | 5.71E-09   | 1.63E-03  | 9.33E-05 | 2.03E-05   | 2.43E-06   | 4.87E-03   | 8.89E-02 |
| Cadmio (C)                | 3.41E-05              | 6.29E-05           | NA                 | 3.58E-09           | 3.41E-02   | 6.29E-02   | NA         | 3.58E-06   | 2.42E-06   | 1.39E-08 | 4.25E-11   | 2.42E-03  | 1.39E-05 | NA         | 2.17E-06   | NA         | 1.07E-01 |
| Cromo (C)                 | 1.52E-04              | 1.32E-02           | NA                 | 1.16E-06           | 5.06E-02   | 4.40E+00   | NA         | 3.88E-04   | 3.60E-04   | 2.06E-05 | 6.32E-09   | 1.20E-01  | 6.88E-03 | 1.12E-04   | 1.95E-07   | 1.95E-03   | 4.63E+00 |
| Cobalto (NC)              | 4.29E-05              | 9.50E-05           | NA                 | 8.10E-07           | 1.43E-01   | 3.17E-01   | NA         | 2.70E-03   | 6.54E-05   | 3.75E-07 | 1.15E-09   | 2.18E-01  | 1.25E-03 | 3.39E-04   | 9.73E-07   | 1.62E-01   | 1.09E+00 |
| Cobre (NC)                | 4.48E-02              | 1.62E-02           | NA                 | 4.59E-06           | 4.98E-01   | 1.80E-01   | NA         | 5.10E-05   | 1.17E-03   | 4.02E-05 | 2.05E-08   | 1.30E-02  | 4.47E-04 | 3.64E-05   | 2.14E-06   | 2.14E-03   | 7.02E-01 |
| Hierro (NC)               | 2.44E-02              | 4.49E-02           | NA                 | 7.94E-06           | 3.48E-02   | 6.42E-02   | NA         | 1.13E-05   | 2.60E-01   | 1.49E-02 | 4.56E-06   | 3.71E-01  | 2.13E-02 | NA         | 2.50E-05   | NA         | 6.22E-01 |
| Plomo (NC)                | 1.64E-05              | 2.26E-04           | NA                 | 1.88E-07           | 4.54E-03   | 6.29E-02   | NA         | 5.22E-05   | 1.45E-04   | 5.00E-07 | 2.55E-09   | 4.04E-02  | 1.39E-04 | NA         | 3.27E-06   | NA         | 1.23E-01 |
| Manganeso (NC)            | 1.53E-02              | 2.82E-02           | NA                 | 1.31E-05           | 2.54E-01   | 4.69E-01   | NA         | 2.18E-04   | 3.26E-03   | 1.87E-04 | 5.71E-08   | 5.43E-02  | 3.11E-03 | 2.03E-03   | 6.49E-08   | 1.30E-03   | 8.53E-01 |
| Mercurio (NC)             | 3.54E-06              | 1.06E-05           | NA                 | 7.10E-07           | 3.54E-02   | 1.06E-01   | NA         | 7.10E-03   | 5.13E-07   | 2.94E-08 | 9.00E-12   | 2.56E-04  | 1.47E-05 | 5.32E-08   | 2.27E-06   | 7.57E-03   | 1.64E-01 |
| Molibdeno (NC)            | 1.09E-04              | 2.01E-04           | NA                 | 3.32E-08           | 2.18E-02   | 4.03E-02   | NA         | 6.63E-06   | 1.94E-05   | 1.11E-07 | 3.40E-10   | 3.88E-03  | 2.22E-05 | 5.03E-08   | 3.26E-06   | 2.72E-04   | 7.16E-02 |
| Níquel (C)                | 1.36E-04              | 2.01E-03           | NA                 | 1.64E-07           | 1.14E-02   | 1.67E-01   | NA         | 1.37E-05   | 2.42E-05   | 2.78E-06 | 4.25E-10   | 2.02E-03  | 2.32E-04 | 4.19E-05   | 4.79E-06   | 2.66E-01   | 4.52E-01 |
| Talio (NC)                | 2.27E-05              | 4.19E-05           | NA                 | 3.07E-07           | 4.54E-03   | 8.39E-03   | NA         | 6.15E-05   | 9.70E-06   | 5.56E-08 | 1.70E-10   | 1.94E-03  | 1.11E-05 | NA         | 1.95E-07   | NA         | 1.94E-02 |
| Vanadio (NC)              | 2.21E-04              | 4.08E-04           | NA                 | 7.08E-07           | 4.38E-02   | 8.09E-02   | NA         | 1.40E-04   | 7.85E-04   | 4.50E-05 | 1.38E-08   | 1.56E-01  | 8.93E-03 | NA         | 5.84E-07   | NA         | 3.77E-01 |
| Zinc (NC)                 | 9.95E-03              | 3.06E-02           | NA                 | 9.24E-05           | 3.32E-02   | 1.02E-01   | NA         | 3.08E-04   | 2.79E-04   | 1.60E-05 | 4.89E-09   | 9.29E-04  | 5.33E-05 | NA         | 2.86E-06   | NA         | 1.41E-01 |

<sup>(a)</sup>
Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:
Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 27    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.18E-03           | 2.18E-03            | 2.21E-04              | 8.05E-05 | 2.21E-04      | 8.05E-05 | 3.25E-03      | 2.57E-03               | 3.25E-03                    | 2.57E-03 | 2.49E-03   | 2.49E-03   |
| Arsénico (C)              | 6.36E-06           | 2.12E-02            | 1.01E-07              | 3.68E-08 | 3.37E-04      | 1.23E-04 | 6.82E-07      | 1.62E-07               | 2.27E-03                    | 5.39E-04 | 1.23E-06   | 4.10E-03   |
| Bario (NC)                | 5.02E-04           | 2.51E-03            | 8.33E-06              | 3.04E-06 | 4.17E-05      | 1.52E-05 | 1.89E-05      | 1.50E-05               | 9.47E-05                    | 7.49E-05 | 1.99E-04   | 9.95E-04   |
| Cadmio (C)                | 1.27E-06           | 2.55E-03            | 5.56E-08              | 2.02E-08 | 1.11E-04      | 4.05E-05 | 4.04E-08      | 3.19E-09               | 4.04E-05                    | 3.19E-06 | 1.76E-06   | 1.76E-03   |
| Cromo (C)                 | 6.36E-06           | 2.12E-03            | 3.79E-07              | 1.38E-07 | 1.26E-04      | 4.60E-05 | 6.18E-06      | 4.88E-06               | 2.06E-03                    | 1.63E-03 | 3.26E-05   | 1.09E-02   |
| Cobalto (NC)              | 6.36E-06           | 2.12E-02            | 5.05E-07              | 7.36E-08 | 1.68E-03      | 2.45E-04 | 3.34E-06      | 2.64E-07               | 1.11E-02                    | 8.81E-04 | 2.33E-06   | 7.78E-03   |
| Cobre (NC)                | 1.24E-04           | 1.24E-03            | 2.83E-06              | 1.03E-06 | 2.83E-05      | 1.03E-05 | 2.76E-05      | 1.31E-05               | 2.76E-04                    | 1.31E-04 | 4.90E-05   | 4.90E-04   |
| Hierro (NC)               | 2.60E-03           | 3.71E-03            | 2.22E-04              | 8.09E-05 | 3.17E-04      | 1.16E-04 | 8.36E-03      | 6.61E-03               | 1.19E-02                    | 9.44E-03 | NA         | NA         |
| Plomo (NC)                | 6.36E-06           | 1.77E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 2.12E-06      | 1.00E-07               | 5.88E-04                    | 2.79E-05 | 6.16E-06   | 1.71E-03   |
| Manganeso (NC)            | 4.88E-04           | 8.14E-03            | 1.79E-05              | 6.52E-06 | 2.98E-04      | 1.09E-04 | 1.48E-04      | 1.17E-04               | 2.47E-03                    | 1.95E-03 | 4.44E-04   | 7.39E-03   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-04            | 1.01E-08              | 3.68E-09 | 5.05E-06      | 1.84E-06 | 3.40E-09      | 2.69E-09               | 1.70E-06                    | 1.35E-06 | 7.15E-07   | 7.15E-03   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 2.53E-07              | 9.20E-08 | 5.05E-05      | 1.84E-05 | 9.42E-07      | 7.45E-08               | 1.88E-04                    | 1.49E-05 | 4.02E-06   | 8.04E-04   |
| Níquel (C)                | 6.36E-06           | 5.30E-04            | 3.03E-07              | 2.21E-08 | 2.53E-05      | 1.84E-06 | 1.53E-06      | 2.42E-06               | 1.28E-04                    | 2.02E-04 | 1.86E-05   | 1.55E-03   |
| Selenio (NC)              | 6.36E-06           | 1.27E-03            | 1.77E-07              | 6.44E-08 | 3.54E-05      | 1.29E-05 | 1.94E-07      | 1.53E-08               | 3.87E-05                    | 3.06E-06 | 1.03E-05   | 2.06E-03   |
| Vanadio (NC)              | 1.89E-05           | 3.75E-03            | 7.24E-07              | 2.64E-07 | 1.44E-04      | 5.24E-05 | 2.16E-05      | 1.70E-05               | 4.28E-03                    | 3.38E-03 | 5.04E-06   | 1.00E-03   |
| Zinc (NC)                 | 2.23E-04           | 7.43E-04            | 2.14E-06              | 4.68E-07 | 7.13E-06      | 1.56E-06 | 1.60E-05      | 1.27E-05               | 5.35E-05                    | 4.23E-05 | 6.01E-04   | 2.00E-03   |



Tabla 27 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.30E-03              | 1.72E-02           | NA                 | 1.15E-04           | 9.30E-03   | 1.72E-02   | NA         | 1.15E-04   | 8.90E-03   | 5.03E-03 | 1.06E-06   | 8.90E-03  | 5.03E-03 | 9.50E-04   | 1.95E-05   | 3.89E-03   | 5.61E-02 |
| Arsénico (C)              | 1.36E-05              | 2.52E-05           | NA                 | 1.41E-08           | 4.54E-02   | 8.39E-02   | NA         | 4.70E-05   | 1.41E-06   | 2.40E-07 | 1.69E-10   | 4.71E-03  | 7.99E-04 | NA         | 7.14E-07   | NA         | 1.63E-01 |
| Bario (NC)                | 6.74E-03              | 8.27E-03           | NA                 | 5.40E-08           | 3.37E-02   | 4.14E-02   | NA         | 2.70E-07   | 1.90E-05   | 1.07E-05 | 2.26E-09   | 9.49E-05  | 5.36E-05 | 2.03E-05   | 2.43E-06   | 4.87E-03   | 8.38E-02 |
| Cadmio (C)                | 3.41E-05              | 6.29E-05           | NA                 | 3.58E-09           | 3.41E-02   | 6.29E-02   | NA         | 3.58E-06   | 1.41E-07   | 7.99E-09 | 1.69E-11   | 1.41E-04  | 7.99E-06 | NA         | 2.17E-06   | NA         | 1.02E-01 |
| Cromo (C)                 | 1.52E-04              | 1.32E-02           | NA                 | 1.16E-06           | 5.06E-02   | 4.40E+00   | NA         | 3.88E-04   | 2.10E-05   | 1.19E-05 | 2.50E-09   | 7.00E-03  | 3.95E-03 | 1.12E-04   | 1.95E-07   | 1.95E-03   | 4.48E+00 |
| Cobalto (NC)              | 4.29E-05              | 9.50E-05           | NA                 | 8.10E-07           | 1.43E-01   | 3.17E-01   | NA         | 2.70E-03   | 3.82E-06   | 2.16E-07 | 4.55E-10   | 1.27E-02  | 7.18E-04 | 3.39E-04   | 9.73E-07   | 1.62E-01   | 6.82E-01 |
| Cobre (NC)                | 4.48E-02              | 1.62E-02           | NA                 | 4.59E-06           | 4.48E-01   | 1.62E-01   | NA         | 4.59E-05   | 6.82E-05   | 2.31E-05 | 8.14E-09   | 6.82E-04  | 2.31E-04 | 3.64E-05   | 2.14E-06   | 2.14E-03   | 6.15E-01 |
| Hierro (NC)               | 2.44E-02              | 4.49E-02           | NA                 | 7.94E-06           | 3.48E-02   | 6.42E-02   | NA         | 1.13E-05   | 1.52E-02   | 8.56E-03 | 1.81E-06   | 2.17E-02  | 1.22E-02 | NA         | 2.50E-05   | NA         | 5.94E-02 |
| Plomo (NC)                | 1.64E-05              | 2.26E-04           | NA                 | 1.88E-07           | 4.54E-03   | 6.29E-02   | NA         | 5.22E-05   | 8.49E-06   | 2.88E-07 | 1.01E-09   | 2.36E-03  | 7.99E-05 | NA         | 3.27E-06   | NA         | 7.41E-02 |
| Manganeso (NC)            | 1.53E-02              | 2.82E-02           | NA                 | 1.31E-05           | 2.54E-01   | 4.69E-01   | NA         | 2.18E-04   | 1.90E-04   | 1.07E-04 | 2.27E-08   | 3.17E-03  | 1.79E-03 | 2.03E-03   | 6.49E-08   | 1.30E-03   | 7.53E-01 |
| Mercurio (NC)             | 3.54E-06              | 1.06E-05           | NA                 | 7.10E-07           | 3.54E-02   | 1.06E-01   | NA         | 7.10E-03   | 2.99E-08   | 1.69E-08 | 3.57E-12   | 1.50E-05  | 8.44E-06 | 5.32E-08   | 2.27E-06   | 7.57E-03   | 1.64E-01 |
| Molibdeno (NC)            | 1.09E-04              | 2.01E-04           | NA                 | 3.32E-08           | 2.18E-02   | 4.03E-02   | NA         | 6.63E-06   | 1.13E-06   | 6.39E-08 | 1.35E-10   | 2.26E-04  | 1.28E-05 | 5.03E-08   | 3.26E-06   | 2.72E-04   | 6.43E-02 |
| Níquel (C)                | 1.36E-04              | 2.01E-03           | NA                 | 1.64E-07           | 1.14E-02   | 1.67E-01   | NA         | 1.37E-05   | 1.41E-06   | 1.60E-06 | 1.69E-10   | 1.18E-04  | 1.33E-04 | 4.19E-05   | 4.79E-06   | 2.66E-01   | 4.47E-01 |
| Selenio (NC)              | 2.27E-05              | 4.19E-05           | NA                 | 3.07E-07           | 4.54E-03   | 8.39E-03   | NA         | 6.15E-05   | 5.66E-07   | 3.19E-08 | 6.75E-11   | 1.13E-04  | 6.39E-06 | NA         | NA         | NA         | 1.65E-02 |
| Vanadio (NC)              | 2.21E-04              | 4.08E-04           | NA                 | 7.08E-07           | 4.38E-02   | 8.09E-02   | NA         | 1.40E-04   | 4.58E-05   | 2.59E-05 | 5.46E-09   | 9.09E-03  | 5.13E-03 | NA         | 5.84E-07   | NA         | 1.52E-01 |
| Zinc (NC)                 | 9.95E-03              | 3.06E-02           | NA                 | 9.24E-05           | 3.32E-02   | 1.02E-01   | NA         | 3.08E-04   | 1.63E-05   | 9.18E-06 | 1.94E-09   | 5.42E-05  | 3.06E-05 | NA         | 2.86E-06   | NA         | 1.38E-01 |

**Tabla 27    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 8.73E-04           | 0.00E+00              | 8.84E-05              | 3.22E-05 | NA             | NA       | 1.30E-03      | 1.03E-03               | NA                            | NA       | 9.94E-04   | NA           |
| Arsénico (C)             | 2.55E-06           | 3.82E-06              | 4.04E-08              | 1.47E-08 | 6.06E-08       | 2.21E-08 | 2.73E-07      | 6.47E-08               | 4.09E-07                      | 9.71E-08 | 4.91E-07   | 7.37E-07     |
| Bario (NC)               | 2.01E-04           | 0.00E+00              | 3.33E-06              | 1.21E-06 | NA             | NA       | 7.58E-06      | 5.99E-06               | NA                            | NA       | 7.96E-05   | NA           |
| Cadmio (C)               | 5.09E-07           | NA                    | 2.22E-08              | 8.10E-09 | NA             | NA       | 1.62E-08      | 1.28E-09               | NA                            | NA       | 7.04E-07   | NA           |
| Cromo (C)                | 2.55E-06           | NA                    | 1.52E-07              | 5.52E-08 | NA             | NA       | 2.47E-06      | 1.95E-06               | NA                            | NA       | 1.30E-05   | NA           |
| Cobalto (NC)             | 2.55E-06           | NA                    | 2.02E-07              | 2.95E-08 | NA             | NA       | 1.34E-06      | 1.06E-07               | NA                            | NA       | 9.34E-07   | NA           |
| Cobre (NC)               | 4.97E-05           | NA                    | 1.13E-06              | 4.13E-07 | NA             | NA       | 1.10E-05      | 5.23E-06               | NA                            | NA       | 1.96E-05   | NA           |
| Hierro (NC)              | 1.04E-03           | NA                    | 8.89E-05              | 3.24E-05 | NA             | NA       | 3.35E-03      | 2.64E-03               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 2.55E-06           | NA                    | 8.08E-08              | 2.95E-09 | NA             | NA       | 8.47E-07      | 4.02E-08               | NA                            | NA       | 2.46E-06   | NA           |
| Manganeso (NC)           | 1.95E-04           | NA                    | 7.16E-06              | 2.61E-06 | NA             | NA       | 5.92E-05      | 4.68E-05               | NA                            | NA       | 1.77E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 4.04E-09              | 1.47E-09 | NA             | NA       | 1.36E-09      | 1.08E-09               | NA                            | NA       | 2.86E-07   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 1.01E-07              | 3.68E-08 | NA             | NA       | 3.77E-07      | 2.98E-08               | NA                            | NA       | 1.61E-06   | NA           |
| Níquel (C)               | 2.55E-06           | NA                    | 1.21E-07              | 8.84E-09 | NA             | NA       | 6.13E-07      | 9.70E-07               | NA                            | NA       | 7.43E-06   | NA           |
| Selenio (NC)             | 2.55E-06           | 0.00E+00              | 7.07E-08              | 2.58E-08 | NA             | NA       | 7.74E-08      | 6.12E-09               | NA                            | NA       | 4.12E-06   | NA           |
| Vanadio (NC)             | 7.56E-06           | 0.00E+00              | 2.90E-07              | 1.06E-07 | NA             | NA       | 8.62E-06      | 6.82E-06               | NA                            | NA       | 2.02E-06   | NA           |
| Zinc (NC)                | 8.91E-05           | 0.00E+00              | 8.56E-07              | 1.87E-07 | NA             | NA       | 6.42E-06      | 5.07E-06               | NA                            | NA       | 2.40E-04   | NA           |

Tabla 27 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 3.72E-03              | 6.86E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 3.56E-03   | 2.01E-03 | 4.25E-07   | NA        | NA       | NA         | 7.78E-06   | NA         | NA         |
| Arsénico (C)             | 5.45E-06              | 1.01E-05           | NA                 | 5.64E-09           | 8.18E-06     | 1.51E-05     | NA           | 8.46E-09     | 5.66E-07   | 9.58E-08 | 6.75E-11   | 8.49E-07  | 1.44E-07 | 4.53E-10   | 2.86E-07   | 4.28E-07   | 2.98E-05   |
| Bario (NC)               | 2.70E-03              | 3.31E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 7.59E-06   | 4.29E-06 | 9.06E-10   | NA        | NA       | NA         | 9.73E-07   | NA         | NA         |
| Cadmio (C)               | 1.36E-05              | 2.52E-05           | NA                 | 1.43E-09           | NA           | NA           | NA           | NA           | 5.66E-08   | 3.19E-09 | 6.75E-12   | NA        | NA       | 5.43E-11   | 8.70E-07   | 1.57E-06   | 1.57E-06   |
| Cromo (C)                | 6.07E-05              | 5.28E-03           | NA                 | 4.66E-07           | NA           | NA           | NA           | NA           | 8.40E-06   | 4.74E-06 | 1.00E-09   | NA        | NA       | 1.79E-07   | 7.79E-08   | 3.12E-06   | 3.29E-06   |
| Cobalto (NC)             | 1.72E-05              | 3.80E-05           | NA                 | 3.24E-07           | NA           | NA           | NA           | NA           | 1.53E-06   | 8.62E-08 | 1.82E-10   | NA        | NA       | NA         | 3.89E-07   | NA         | NA         |
| Cobre (NC)               | 1.79E-02              | 6.47E-03           | NA                 | 1.84E-06           | NA           | NA           | NA           | NA           | 2.73E-05   | 9.25E-06 | 3.25E-09   | NA        | NA       | NA         | 8.57E-07   | NA         | NA         |
| Hierro (NC)              | 9.74E-03              | 1.80E-02           | NA                 | 3.18E-06           | NA           | NA           | NA           | NA           | 6.06E-03   | 3.42E-03 | 7.23E-07   | NA        | NA       | NA         | 1.00E-05   | NA         | NA         |
| Plomo (NC)               | 6.54E-06              | 9.06E-05           | NA                 | 7.52E-08           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.15E-07 | 4.05E-10   | NA        | NA       | NA         | 1.31E-06   | NA         | NA         |
| Manganeso (NC)           | 6.10E-03              | 1.13E-02           | NA                 | 5.24E-06           | NA           | NA           | NA           | NA           | 7.60E-05   | 4.29E-05 | 9.06E-09   | NA        | NA       | NA         | 2.60E-08   | NA         | NA         |
| Mercurio (NC)            | 1.42E-06              | 4.26E-06           | NA                 | 2.84E-07           | NA           | NA           | NA           | NA           | 1.20E-08   | 6.76E-09 | 1.43E-12   | NA        | NA       | NA         | 9.09E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.36E-05              | 8.05E-05           | NA                 | 1.33E-08           | NA           | NA           | NA           | NA           | 4.53E-07   | 2.56E-08 | 5.40E-11   | NA        | NA       | NA         | 1.30E-06   | NA         | NA         |
| Níquel (C)               | 5.45E-05              | 8.03E-04           | NA                 | 6.56E-08           | NA           | NA           | NA           | NA           | 5.66E-07   | 6.39E-07 | 6.75E-11   | NA        | NA       | 1.15E-10   | 1.91E-06   | 7.27E-07   | 7.28E-07   |
| Selenio (NC)             | 9.09E-06              | 1.68E-05           | NA                 | NA                 | NA           | NA           | NA           | NA           | 2.26E-07   | 1.28E-08 | 2.70E-11   | NA        | NA       | NA         | 7.79E-08   | NA         | NA         |
| Vanadio (NC)             | 8.83E-05              | 1.63E-04           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.83E-05   | 1.03E-05 | 2.19E-09   | NA        | NA       | NA         | 2.34E-07   | NA         | NA         |
| Zinc (NC)                | 3.98E-03              | 1.22E-02           | NA                 | NA                 | NA           | NA           | NA           | NA           | 6.51E-06   | 3.67E-06 | 7.76E-10   | NA        | NA       | NA         | 1.14E-06   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



**Tabla 28**
**Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                  |                  |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|------------------|------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                  |                  |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición Fruta      | Exposición Arroz | Exposición Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión        | Ingestión        | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                  |                  |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.53E-01   | 8.75E-03 | 2.68E-06   | 1.53E-01  | 8.75E-03 | 9.50E-04   | 5.47E-06   | 1.09E-03   | 1.63E-01 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.42E-05   | 4.17E-07 | 4.25E-10   | 8.08E-02  | 1.39E-03 | NA         | 2.29E-07   | NA         | 8.22E-02 |
| Bario (NC)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.25E-04   | 1.87E-05 | 5.71E-09   | 1.63E-03  | 9.33E-05 | 2.03E-05   | 6.84E-07   | 1.37E-03   | 3.11E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.42E-06   | 1.39E-08 | 4.25E-11   | 2.42E-03  | 1.39E-05 | NA         | 6.11E-07   | NA         | 2.44E-03 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.60E-04   | 2.06E-05 | 6.32E-09   | 1.20E-01  | 6.88E-03 | 1.12E-04   | 6.25E-08   | 6.25E-04   | 1.28E-01 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.54E-05   | 3.75E-07 | 1.15E-09   | 2.18E-01  | 1.25E-03 | 3.39E-04   | 2.74E-07   | 4.56E-02   | 2.65E-01 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.17E-03   | 4.02E-05 | 2.05E-08   | 1.30E-02  | 4.47E-04 | 3.64E-05   | 6.88E-07   | 6.88E-04   | 1.42E-02 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.60E-01   | 1.49E-02 | 4.56E-06   | 3.71E-01  | 2.13E-02 | NA         | 7.03E-06   | NA         | 3.92E-01 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.45E-04   | 5.00E-07 | 2.55E-09   | 4.04E-02  | 1.39E-04 | NA         | 1.05E-06   | NA         | 4.05E-02 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.26E-03   | 1.87E-04 | 5.71E-08   | 5.43E-02  | 3.11E-03 | 2.03E-03   | 1.83E-08   | 3.65E-04   | 5.98E-02 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.13E-07   | 2.94E-08 | 9.00E-12   | 2.56E-04  | 1.47E-05 | 5.32E-08   | 6.39E-07   | 2.13E-03   | 2.40E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.94E-05   | 1.11E-07 | 3.40E-10   | 3.88E-03  | 2.22E-05 | 5.03E-08   | 9.17E-07   | 7.64E-05   | 3.98E-03 |
| Níquel (C)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.42E-05   | 2.78E-06 | 4.25E-10   | 2.02E-03  | 2.32E-04 | 4.19E-05   | 1.35E-06   | 7.52E-02   | 7.75E-02 |
| Talio (NC)                | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 9.70E-06   | 5.56E-08 | 1.70E-10   | 1.94E-03  | 1.11E-05 | NA         | 6.25E-08   | NA         | 1.95E-03 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.85E-04   | 4.50E-05 | 1.38E-08   | 1.56E-01  | 8.93E-03 | NA         | 1.88E-07   | NA         | 1.65E-01 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00         | NA               | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.79E-04   | 1.60E-05 | 4.89E-09   | 9.29E-04  | 5.33E-05 | NA         | 8.03E-07   | NA         | 9.82E-04 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.



Tabla 29 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación no Cancerígena |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición<br>- Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.90E-03   | 5.03E-03 | 1.06E-06   | 8.90E-03  | 5.03E-03 | 9.50E-04   | 5.47E-06   | 1.09E-03   | 1.60E-02 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.41E-06   | 2.40E-07 | 1.69E-10   | 4.71E-03  | 7.99E-04 | NA         | 2.29E-07   | NA         | 5.51E-03 |
| Bario (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.90E-05   | 1.07E-05 | 2.26E-09   | 9.49E-05  | 5.36E-05 | 2.03E-05   | 6.84E-07   | 1.37E-03   | 1.54E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.41E-07   | 7.99E-09 | 1.69E-11   | 1.41E-04  | 7.99E-06 | NA         | 6.11E-07   | NA         | 1.49E-04 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.10E-05   | 1.19E-05 | 2.50E-09   | 7.00E-03  | 3.95E-03 | 1.12E-04   | 6.25E-08   | 6.25E-04   | 1.17E-02 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.82E-06   | 2.16E-07 | 4.55E-10   | 1.27E-02  | 7.18E-04 | 3.39E-04   | 2.74E-07   | 4.56E-02   | 5.94E-02 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.82E-05   | 2.31E-05 | 8.14E-09   | 6.82E-04  | 2.31E-04 | 3.64E-05   | 6.88E-07   | 6.88E-04   | 1.64E-03 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.52E-02   | 8.56E-03 | 1.81E-06   | 2.17E-02  | 1.22E-02 | NA         | 7.03E-06   | NA         | 3.39E-02 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.49E-06   | 2.88E-07 | 1.01E-09   | 2.36E-03  | 7.99E-05 | NA         | 1.05E-06   | NA         | 2.44E-03 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.90E-04   | 1.07E-04 | 2.27E-08   | 3.17E-03  | 1.79E-03 | 2.03E-03   | 1.83E-08   | 3.65E-04   | 7.35E-03 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.99E-08   | 1.69E-08 | 3.57E-12   | 1.50E-05  | 8.44E-06 | 5.32E-08   | 6.39E-07   | 2.13E-03   | 2.15E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.13E-06   | 6.39E-08 | 1.35E-10   | 2.26E-04  | 1.28E-05 | 5.03E-08   | 9.17E-07   | 7.64E-05   | 3.16E-04 |
| Níquel (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.41E-06   | 1.60E-06 | 1.69E-10   | 1.18E-04  | 1.33E-04 | 4.19E-05   | 1.35E-06   | 7.52E-02   | 7.55E-02 |
| Selenio (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.66E-07   | 3.19E-08 | 6.75E-11   | 1.13E-04  | 6.39E-06 | NA         | 6.25E-08   | NA         | 1.20E-04 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.58E-05   | 2.59E-05 | 5.46E-09   | 9.09E-03  | 5.13E-03 | NA         | 1.88E-07   | NA         | 1.42E-02 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.63E-05   | 9.18E-06 | 1.94E-09   | 5.42E-05  | 3.06E-05 | NA         | 8.03E-07   | NA         | 8.48E-05 |





Tabla 29 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.56E-03   | 2.01E-03 | 4.25E-07   | NA        | NA       | NA         | 2.19E-06   | NA         | NA         |
| Arsénico (C)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00     | 0.00E+00     | NA           | 0.00E+00     | 5.66E-07   | 9.58E-08 | 6.75E-11   | 8.49E-07  | 1.44E-07 | 4.53E-10   | 9.17E-08   | 1.38E-07   | 1.13E-06   |
| Bario (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 7.59E-06   | 4.29E-06 | 9.06E-10   | NA        | NA       | NA         | 2.74E-07   | NA         | NA         |
| Cadmio (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.66E-08   | 3.19E-09 | 6.75E-12   | NA        | NA       | 5.43E-11   | 2.45E-07   | 4.40E-07   | 4.40E-07   |
| Cromo (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 8.40E-06   | 4.74E-06 | 1.00E-09   | NA        | NA       | 1.79E-07   | 2.50E-08   | 1.00E-06   | 1.18E-06   |
| Cobalto (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.53E-06   | 8.62E-08 | 1.82E-10   | NA        | NA       | NA         | 1.10E-07   | NA         | NA         |
| Cobre (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.73E-05   | 9.25E-06 | 3.25E-09   | NA        | NA       | NA         | 2.75E-07   | NA         | NA         |
| Hierro (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 6.06E-03   | 3.42E-03 | 7.23E-07   | NA        | NA       | NA         | 2.81E-06   | NA         | NA         |
| Plomo (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.39E-06   | 1.15E-07 | 4.05E-10   | NA        | NA       | NA         | 4.19E-07   | NA         | NA         |
| Manganeso (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 7.60E-05   | 4.29E-05 | 9.06E-09   | NA        | NA       | NA         | 7.30E-09   | NA         | NA         |
| Mercurio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.20E-08   | 6.76E-09 | 1.43E-12   | NA        | NA       | NA         | 2.56E-07   | NA         | NA         |
| Molibdeno (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.53E-07   | 2.56E-08 | 5.40E-11   | NA        | NA       | NA         | 3.67E-07   | NA         | NA         |
| Níquel (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.66E-07   | 6.39E-07 | 6.75E-11   | NA        | NA       | 1.15E-10   | 5.42E-07   | 2.06E-07   | 2.06E-07   |
| Selenio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.26E-07   | 1.28E-08 | 2.70E-11   | NA        | NA       | NA         | 2.50E-08   | NA         | NA         |
| Vanadio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.83E-05   | 1.03E-05 | 2.19E-09   | NA        | NA       | NA         | 7.50E-08   | NA         | NA         |
| Zinc (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 6.51E-06   | 3.67E-06 | 7.76E-10   | NA        | NA       | NA         | 3.21E-07   | NA         | NA         |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Tabla 30    Resumen de Cocientes de Peligro/Valores de ILCR, Proyecto Mina de Cobre Panamá, Caso de Línea Base para Panamá - Estimación de la Exposición de Tendencia Central

| Parámetro      | Poblaciones Costeras |          |            | Poblaciones Indígenas |          |            | Poblaciones Agrícolas |          |            | Poblaciones en la Línea de Cerco |          |            |
|----------------|----------------------|----------|------------|-----------------------|----------|------------|-----------------------|----------|------------|----------------------------------|----------|------------|
|                | Niños Pequeños       | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños                   | Adultos  |            |
|                | IP Total             | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total                         | IP Total | ILCR Total |
| Metales        |                      |          |            |                       |          |            |                       |          |            |                                  |          |            |
| Aluminio (NC)  | 1.87E-01             | 3.16E-02 | NA         | 3.24E-01              | 8.82E-02 | NA         | 2.60E-01              | 5.61E-02 | NA         | 1.63E-01                         | 1.60E-02 | NA         |
| Arsénico (C)   | 3.39E-01             | 1.85E-01 | 3.31E-05   | 3.42E-01              | 1.97E-01 | 3.58E-05   | 2.94E-01              | 1.63E-01 | 2.98E-05   | 8.22E-02                         | 5.51E-03 | 1.13E-06   |
| Bario (NC)     | 4.67E-02             | 4.33E-02 | NA         | 9.90E-02              | 9.31E-02 | NA         | 8.89E-02              | 8.38E-02 | NA         | 3.11E-03                         | 1.54E-03 | NA         |
| Cadmio (C)     | 6.20E-02             | 5.73E-02 | 2.01E-07   | 1.31E-01              | 1.22E-01 | 1.45E-06   | 1.07E-01              | 1.02E-01 | 1.57E-06   | 2.44E-03                         | 1.49E-04 | 4.40E-07   |
| Cromo (C)      | 2.81E+00             | 2.69E+00 | 4.36E-07   | 5.14E+00              | 4.97E+00 | 3.06E-06   | 4.63E+00              | 4.48E+00 | 3.29E-06   | 1.28E-01                         | 1.17E-02 | 1.18E-06   |
| Cobalto (NC)   | 6.00E-01             | 3.33E-01 | NA         | 1.37E+00              | 8.32E-01 | NA         | 1.09E+00              | 6.82E-01 | NA         | 2.65E-01                         | 5.94E-02 | NA         |
| Cobre (NC)     | 3.30E-01             | 2.85E-01 | NA         | 7.19E-01              | 6.28E-01 | NA         | 7.02E-01              | 6.15E-01 | NA         | 1.42E-02                         | 1.64E-03 | NA         |
| Hierro (NC)    | 4.39E-01             | 3.54E-02 | NA         | 7.47E-01              | 8.93E-02 | NA         | 6.22E-01              | 5.94E-02 | NA         | 3.92E-01                         | 3.39E-02 | NA         |
| Plomo (NC)     | 8.60E-02             | 4.54E-02 | NA         | 1.46E-01              | 9.22E-02 | NA         | 1.23E-01              | 7.41E-02 | NA         | 4.05E-02                         | 2.44E-03 | NA         |
| Manganeso (NC) | 4.80E-01             | 4.14E-01 | NA         | 9.76E-01              | 8.51E-01 | NA         | 8.53E-01              | 7.53E-01 | NA         | 5.98E-02                         | 7.35E-03 | NA         |
| Mercurio (NC)  | 2.17E-01             | 2.16E-01 | NA         | 2.11E-01              | 2.10E-01 | NA         | 1.64E-01              | 1.64E-01 | NA         | 2.40E-03                         | 2.15E-03 | NA         |
| Molibdeno (NC) | 4.13E-02             | 3.54E-02 | NA         | 8.57E-02              | 7.53E-02 | NA         | 7.16E-02              | 6.43E-02 | NA         | 3.98E-03                         | 3.16E-04 | NA         |
| Níquel (C)     | 1.45E-01             | 1.42E-01 | 9.34E-08   | 4.60E-01              | 4.53E-01 | 6.72E-07   | 4.52E-01              | 4.47E-01 | 7.28E-07   | 7.75E-02                         | 7.55E-02 | 2.06E-07   |
| Selenio (NC)   | 2.59E-02             | 2.30E-02 | NA         | 3.49E-02              | 3.04E-02 | NA         | 1.94E-02              | 1.65E-02 | NA         | 1.95E-03                         | 1.20E-04 | NA         |
| Vanadio (NC)   | 2.68E-01             | 9.03E-02 | NA         | 4.34E-01              | 1.75E-01 | NA         | 3.77E-01              | 1.52E-01 | NA         | 1.65E-01                         | 1.42E-02 | NA         |
| Zinc (NC)      | 8.88E-02             | 8.72E-02 | NA         | 1.62E-01              | 1.59E-01 | NA         | 1.41E-01              | 1.38E-01 | NA         | 9.82E-04                         | 8.48E-05 | NA         |

(a)    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

         Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

Tabla 31    Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimaciones de Tendencia Central

| Parámetro      | Agua -<br>Suministro<br>de Agua de la<br>Comunidad<br>[mg/L] | Agua de Mar<br>[mg/L] | Agua -<br>Comercializa<br>ción Agrícola<br>[mg/L] | Agua -<br>Comunid.<br>Indígenas<br>[mg/L] | Sedimentos -<br>Agua Dulce<br>[mg/kg] | Sedimentos -<br>Marino/<br>Estuarino<br>[mg/kg] | Peces -<br>Comercializa<br>ción Agrícola<br>[mg/kg ww] | Peces -<br>Comunid.<br>Indígenas<br>[mg/kg ww] | Peces -<br>Marino/<br>Estuarino<br>[mg/kg ww] | Suelo<br>Costero<br>[mg/kg] | Suelo<br>Agrícola<br>[mg/kg] | Suelo<br>Indígena<br>[mg/kg] | Suelo Línea<br>de Cerco<br>[mg/kg] |
|----------------|--------------------------------------------------------------|-----------------------|---------------------------------------------------|-------------------------------------------|---------------------------------------|-------------------------------------------------|--------------------------------------------------------|------------------------------------------------|-----------------------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------------|
| Metales        |                                                              |                       |                                                   |                                           |                                       |                                                 |                                                        |                                                |                                               |                             |                              |                              |                                    |
| Aluminio (NC)  | 0.0685625                                                    | 0.134615385           | 0.35                                              | 0.18                                      | 16095.78947                           | 6357.142857                                     | 9.87E+01                                               | 9.87E+01                                       | 19.25454545                                   | 3.15E+04                    | 3.15E+04                     | 3.15E+04                     | 3.21E+04                           |
| Arsénico (C)   | 0.0002                                                       | 0.007057692           | 0.0012                                            | 0.00084                                   | 3.376315789                           | 10.5                                            | 2.93E-01                                               | 1.72E-01                                       | 0.197790909                                   | 5.16E+00                    | 5.04E+00                     | 5.07E+00                     | 1.83E+01                           |
| Bario (NC)     | 0.01576875                                                   | 0.014115385           | 0.025                                             | 0.022                                     | 93.73684211                           | 5.285714286                                     | 1.58E+01                                               | 1.42E+01                                       | 2.245424242                                   | 6.71E+01                    | 6.73E+01                     | 6.71E+01                     | 6.90E+01                           |
| Cadmio (C)     | 0.00004                                                      | 0.0002                | 0.000055                                          | 0.000078                                  | 0.2                                   | 0.2                                             | 6.99E-02                                               | 7.34E-02                                       | 0.022809091                                   | 6.34E-01                    | 6.69E-01                     | 5.26E-01                     | 4.02E+00                           |
| Cromo (C)      | 0.0002                                                       | 0.001                 | 0.0004                                            | 0.00024                                   | 30.56140351                           | 18.92857143                                     | 1.30E+00                                               | 1.30E+00                                       | 0.413636364                                   | 7.50E+01                    | 7.45E+01                     | 7.44E+01                     | 1.01E+02                           |
| Cobalto (NC)   | 0.0002                                                       | 0.001                 | 0.001                                             | 0.001                                     | 16.55263158                           | 10.07142857                                     | 1.08E-01                                               | 1.24E-01                                       | 0.04                                          | 1.35E+01                    | 1.36E+01                     | 1.35E+01                     | 1.66E+01                           |
| Cobre (NC)     | 0.00390625                                                   | 0.011615385           | 0.005                                             | 0.0058                                    | 136.5263158                           | 8.571428571                                     | 1.95E+00                                               | 2.14E+00                                       | 0.634242424                                   | 1.04E+03                    | 2.73E+02                     | 3.00E+02                     | 1.09E+04                           |
| Hierro (NC)    | 0.0815625                                                    | 0.216153846           | 0.35                                              | 0.32                                      | 41,387.7193                           | 24,571.42857                                    |                                                        |                                                |                                               | 5.36E+04                    | 5.37E+04                     | 5.36E+04                     | 5.48E+04                           |
| Plomo (NC)     | 0.0002                                                       | 0.001                 | 0.0003                                            | 0.00028                                   | 10.47807018                           | 3                                               | 2.20E-01                                               | 2.20E-01                                       | 0.04                                          | 3.06E+01                    | 3.01E+01                     | 3.01E+01                     | 5.60E+01                           |
| Manganeso (NC) | 0.01534375                                                   | 0.020807692           | 0.0325                                            | 0.024                                     | 732.5438596                           | 353.5                                           | 2.42E+01                                               | 2.33E+01                                       | 6.673272727                                   | 6.72E+02                    | 6.73E+02                     | 6.72E+02                     | 6.92E+02                           |
| Mercurio (NC)  | 0.00002                                                      | 0.00002               | 0.00002                                           | 0.00002                                   | 0.016842105                           | 0.01                                            | 2.84E-02                                               | 2.84E-02                                       | 0.093045455                                   | 1.36E-01                    | 1.62E-01                     | 1.19E-01                     | 2.68E+00                           |
| Molibdeno (NC) | 0.0001                                                       | 0.009242308           | 0.00525                                           | 0.00458                                   | 4.661403509                           | 1.835714286                                     | 1.66E+00                                               | 3.58E+00                                       | 0.035181818                                   | 4.00E+00                    | 4.05E+00                     | 4.00E+00                     | 4.66E+00                           |
| Níquel (C)     | 0.0002                                                       | 0.001615385           | 0.00035                                           | 0.00022                                   | 7.587719298                           | 6.142857143                                     | 7.37E-01                                               | 8.11E-01                                       | 0.21                                          | 5.09E+00                    | 5.09E+00                     | 5.04E+00                     | 1.35E+01                           |
| Selenio (NC)   | 0.0002                                                       | 0.001                 | 0.0005                                            | 0.00052                                   | 0.957894737                           | 0.2                                             | 4.60E-01                                               | 4.91E-01                                       | 0.594848485                                   | 2.44E+00                    | 2.09E+00                     | 2.20E+00                     | 4.18E+01                           |
| Vanadio (NC)   | 0.00059375                                                   | 0.002153846           | 0.001                                             | 0.00086                                   | 106.6754386                           | 98.21428571                                     | 2.00E-01                                               | 2.00E-01                                       | 0.23                                          | 1.64E+02                    | 1.62E+02                     | 1.62E+02                     | 2.38E+02                           |
| Zinc (NC)      | 0.007                                                        | 0.005                 | 0.00325                                           | 0.0032                                    | 79.42982456                           | 38.28571429                                     | 3.28E+01                                               | 2.86E+01                                       | 26.11121212                                   | 5.76E+01                    | 5.79E+01                     | 5.75E+01                     | 6.18E+01                           |

Tabla 31    Resumen de Concentraciones de COPC, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimaciones de Tendencia Central (continuación)

| Parámetro      | Cultivos -<br>Fruta -<br>Agrícola<br>[mg/kg ww] | Cultivos -<br>Fruta -<br>Indígena<br>[mg/kg ww] | Cultivos -<br>Arroz -<br>Agrícola<br>[mg/kg ww] | Cultivos -<br>Arroz Indígena<br>[mg/kg ww] | Alimentos -<br>Carne -<br>Agrícola<br>[mg/kg ww] | Alimentos -<br>Carne -<br>Indígena<br>[mg/kg ww] | Alimentos -<br>Pollo -<br>Agrícola<br>[mg/kg ww] | Alimentos -<br>Pollo -<br>Indígena<br>[mg/kg ww] | Aire - Rio<br>Caimito<br>[mg/m³] | Aire - Agrícola<br>[mg/m³] | Aire - Indígena<br>[mg/m³] | Aire - Línea de<br>Cerca<br>[mg/m³] |
|----------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------------|
| Metales        |                                                 |                                                 |                                                 |                                            |                                                  |                                                  |                                                  |                                                  |                                  |                            |                            |                                     |
| Aluminio (NC)  | 5.92E+00                                        | 5.26E+00                                        | 1.30E+01                                        | 1.15E+01                                   | 3.25E-01                                         | 3.25E-01                                         | 7.05E-01                                         | 7.03E-01                                         | 3.07E-05                         | 1.13E-04                   | 4.63E-05                   | 1.10E-03                            |
| Arsénico (C)   | 8.25E-03                                        | 8.65E-03                                        | 1.81E-02                                        | 1.90E-02                                   | 2.53E-05                                         | 2.55E-05                                         | 8.89E-05                                         | 8.78E-05                                         | 1.18E-06                         | 1.73E-06                   | 1.60E-06                   | 2.19E-06                            |
| Bario (NC)     | 3.81E+00                                        | 3.80E+00                                        | 5.56E+00                                        | 5.55E+00                                   | 2.15E-04                                         | 2.15E-04                                         | 3.72E-04                                         | 3.31E-04                                         | 3.75E-06                         | 6.05E-06                   | 5.40E-06                   | 6.73E-06                            |
| Cadmio (C)     | 2.82E-02                                        | 2.06E-02                                        | 6.20E-02                                        | 4.52E-02                                   | 2.74E-06                                         | 2.06E-06                                         | 3.17E-05                                         | 2.31E-05                                         | 3.47E-06                         | 5.42E-06                   | 4.84E-06                   | 5.55E-05                            |
| Cromo (C)      | 9.03E-02                                        | 8.76E-02                                        | 8.89E+00                                        | 8.86E+00                                   | 2.06E-03                                         | 2.06E-03                                         | 9.51E-03                                         | 7.15E-03                                         | 1.51E-06                         | 8.47E-07                   | 5.51E-07                   | 1.66E-05                            |
| Cobalto (NC)   | 2.52E-02                                        | 2.44E-02                                        | 6.60E-02                                        | 6.43E-02                                   | 6.23E-04                                         | 6.20E-04                                         | 5.05E-03                                         | 4.97E-03                                         | 1.51E-06                         | 2.42E-06                   | 2.16E-06                   | 2.50E-06                            |
| Cobre (NC)     | 2.90E+01                                        | 3.23E+01                                        | 1.33E+01                                        | 1.54E+01                                   | 6.34E-02                                         | 7.00E-02                                         | 3.77E-02                                         | 3.40E-02                                         | 7.31E-04                         | 4.69E-05                   | 6.98E-05                   | 6.66E-03                            |
| Hierro (NC)    | 1.51E+01                                        | 1.38E+01                                        | 3.32E+01                                        | 3.02E+01                                   | 2.91E-02                                         | 2.90E-02                                         | 4.93E-02                                         | 4.87E-02                                         | 4.01E-05                         | 1.97E-04                   | 6.20E-05                   | 2.27E-03                            |
| Plomo (NC)     | 1.07E-02                                        | 1.11E-02                                        | 1.55E-01                                        | 1.56E-01                                   | 1.69E-05                                         | 1.69E-05                                         | 1.16E-03                                         | 1.16E-03                                         | 5.90E-06                         | 7.94E-06                   | 7.32E-06                   | 1.66E-05                            |
| Manganeso (NC) | 8.64E+00                                        | 8.60E+00                                        | 1.90E+01                                        | 1.89E+01                                   | 1.88E-01                                         | 1.87E-01                                         | 8.51E-02                                         | 8.03E-02                                         | 1.65E-07                         | 2.51E-06                   | 2.71E-07                   | 3.83E-05                            |
| Mercurio (NC)  | 3.82E-03                                        | 2.42E-03                                        | 1.26E-02                                        | 8.41E-03                                   | 6.25E-04                                         | 4.51E-04                                         | 6.84E-03                                         | 4.90E-03                                         | 3.51E-06                         | 5.47E-06                   | 5.04E-06                   | 3.62E-06                            |
| Molibdeno (NC) | 6.29E-02                                        | 6.15E-02                                        | 1.38E-01                                        | 1.35E-01                                   | 9.10E-05                                         | 9.04E-05                                         | 2.46E-04                                         | 2.05E-04                                         | 5.03E-06                         | 7.90E-06                   | 7.23E-06                   | 5.62E-06                            |
| Níquel (C)     | 7.94E-02                                        | 7.80E-02                                        | 1.37E+00                                        | 1.36E+00                                   | 3.01E-04                                         | 2.98E-04                                         | 1.42E-03                                         | 1.01E-03                                         | 7.40E-06                         | 1.15E-05                   | 1.06E-05                   | 7.087E-06                           |
| Selenio (NC)   | 1.46E-02                                        | 1.66E-02                                        | 3.20E-02                                        | 3.65E-02                                   | 4.14E-04                                         | 4.37E-04                                         | 1.99E-03                                         | 2.07E-03                                         | 4.15E-07                         | 5.01E-07                   | 4.67E-07                   | 2.79E-06                            |
| Vanadio (NC)   | 1.30E-01                                        | 1.30E-01                                        | 2.86E-01                                        | 2.86E-01                                   | 6.92E-04                                         | 6.92E-04                                         | 4.38E-03                                         | 4.35E-03                                         | 4.31E-06                         | 1.85E-06                   | 1.60E-06                   | 4.72E-05                            |
| Zinc (NC)      | 5.65E+00                                        | 5.61E+00                                        | 2.06E+01                                        | 2.05E+01                                   | 3.08E-01                                         | 3.06E-01                                         | 6.67E-01                                         | 5.66E-01                                         | 4.43E-06                         | 7.39E-06                   | 6.36E-06                   | 1.195E-05                           |

Nota      Las tendencias centrales utilizaron como modelo las concentraciones de entrada para el medio ambiental: promedio para los datos distribuidos normalmente, geomedia para datos de registro normal y media para datos no paramétricos o datos que en su mayor parte no se detectaron.

**Tabla 32    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua Para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.74E-03           | 3.74E-03            | 1.17E-04              | 1.40E-05 | 1.17E-04      | 1.40E-05 | 8.81E-03      | 7.07E-04               | 8.81E-03                    | 7.07E-04 | 2.33E-03   | 2.33E-03   |
| Arsénico (C)              | 1.09E-05           | 3.64E-02            | 6.11E-06              | 7.36E-07 | 2.04E-02      | 2.45E-03 | 1.45E-05      | 3.50E-07               | 4.85E-02                    | 1.17E-03 | 2.40E-05   | 7.98E-02   |
| Bario (NC)                | 8.60E-04           | 4.30E-03            | 1.22E-05              | 1.47E-06 | 6.11E-05      | 7.36E-06 | 7.32E-06      | 5.88E-07               | 3.66E-05                    | 2.94E-06 | 2.72E-04   | 1.36E-03   |
| Cadmio (C)                | 2.18E-06           | 4.36E-03            | 1.73E-07              | 2.08E-08 | 3.46E-04      | 4.17E-05 | 2.77E-07      | 2.22E-09               | 2.77E-04                    | 2.22E-06 | 2.76E-06   | 2.76E-03   |
| Cromo (C)                 | 1.09E-05           | 3.64E-03            | 8.66E-07              | 1.04E-07 | 2.89E-04      | 3.47E-05 | 2.62E-05      | 2.10E-06               | 8.74E-03                    | 7.01E-04 | 5.01E-05   | 1.67E-02   |
| Cobalto (NC)              | 1.09E-05           | 3.64E-02            | 8.66E-07              | 4.17E-08 | 2.89E-03      | 1.39E-04 | 1.40E-05      | 1.12E-07               | 4.65E-02                    | 3.73E-04 | 4.84E-06   | 1.61E-02   |
| Cobre (NC)                | 2.13E-04           | 2.37E-03            | 1.01E-05              | 1.21E-06 | 1.12E-04      | 1.35E-05 | 1.19E-05      | 5.72E-07               | 1.32E-04                    | 6.35E-06 | 7.68E-05   | 8.53E-04   |
| Hierro (NC)               | 4.45E-03           | 6.36E-03            | 1.87E-04              | 2.25E-05 | 2.67E-04      | 3.22E-05 | 3.40E-02      | 2.73E-03               | 4.86E-02                    | 3.90E-03 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.09E-05           | 3.03E-03            | 8.66E-07              | 1.04E-08 | 2.41E-04      | 2.90E-06 | 4.16E-06      | 2.00E-08               | 1.15E-03                    | 5.56E-06 | 4.84E-06   | 1.35E-03   |
| Manganeso (NC)            | 8.37E-04           | 1.39E-02            | 1.80E-05              | 2.17E-06 | 3.00E-04      | 3.62E-05 | 4.90E-04      | 3.93E-05               | 8.16E-03                    | 6.55E-04 | 8.08E-04   | 1.35E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 1.73E-08              | 2.08E-09 | 8.66E-06      | 1.04E-06 | 1.39E-08      | 1.11E-09               | 6.93E-06                    | 5.56E-07 | 1.13E-05   | 1.13E-01   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 8.00E-06              | 9.63E-07 | 1.60E-03      | 1.93E-04 | 2.54E-06      | 2.04E-08               | 5.09E-04                    | 4.08E-06 | 4.26E-06   | 8.52E-04   |
| Níquel (C)                | 1.09E-05           | 9.09E-04            | 1.40E-06              | 3.37E-08 | 1.17E-04      | 2.81E-06 | 8.51E-06      | 1.37E-06               | 7.09E-04                    | 1.14E-04 | 2.54E-05   | 2.12E-03   |
| Selenio (NC)              | 1.09E-05           | 2.18E-03            | 8.66E-07              | 1.04E-07 | 1.73E-04      | 2.08E-05 | 2.77E-07      | 2.22E-09               | 5.54E-05                    | 4.45E-07 | 7.20E-05   | 1.44E-02   |
| Vanadio (NC)              | 3.24E-05           | 6.43E-03            | 1.86E-06              | 2.25E-07 | 3.70E-04      | 4.45E-05 | 1.36E-04      | 1.09E-05               | 2.70E-02                    | 2.17E-03 | 2.79E-05   | 5.53E-03   |
| Zinc (NC)                 | 3.82E-04           | 1.27E-03            | 4.33E-06              | 3.13E-07 | 1.44E-05      | 1.04E-06 | 5.30E-05      | 4.26E-06               | 1.77E-04                    | 1.42E-05 | 3.16E-03   | 1.05E-02   |

Tabla 32 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 4.32E-03              | 1.16E-02           | 9.73E-06           | 3.85E-04           | 4.32E-03   | 1.16E-02   | 9.73E-06   | 3.85E-04   | 1.53E-01   | 3.50E-03 | 5.36E-07   | 1.53E-01  | 3.50E-03 | 1.90E-04   | 2.56E-06   | 5.12E-04   | 1.89E-01 |
| Arsénico (C)              | 6.02E-06              | 1.62E-05           | 7.57E-10           | 4.85E-08           | 2.01E-02   | 5.41E-02   | 2.52E-06   | 1.62E-04   | 2.50E-05   | 1.72E-07 | 8.79E-11   | 8.34E-02  | 5.74E-04 | NA         | 9.86E-08   | NA         | 3.47E-01 |
| Bario (NC)                | 2.78E-03              | 4.98E-03           | 6.44E-09           | 2.03E-07           | 1.39E-02   | 2.49E-02   | 3.22E-08   | 1.01E-06   | 3.25E-04   | 7.46E-06 | 1.14E-09   | 1.63E-03  | 3.73E-05 | 4.05E-06   | 3.13E-07   | 6.25E-04   | 4.68E-02 |
| Cadmio (C)                | 2.06E-05              | 5.55E-05           | 8.20E-11           | 1.73E-08           | 2.06E-02   | 5.55E-02   | 8.20E-08   | 1.73E-05   | 3.08E-06   | 7.05E-09 | 1.08E-11   | 3.08E-03  | 7.05E-06 | NA         | 2.89E-07   | NA         | 8.70E-02 |
| Cromo (C)                 | 6.59E-05              | 7.96E-03           | 6.17E-08           | 5.19E-06           | 2.20E-02   | 2.65E+00   | 2.06E-05   | 1.73E-03   | 3.63E-04   | 8.33E-06 | 1.28E-09   | 1.21E-01  | 2.78E-03 | 2.26E-05   | 1.26E-07   | 1.26E-03   | 2.83E+00 |
| Cobalto (NC)              | 1.84E-05              | 5.91E-05           | 1.86E-08           | 2.76E-06           | 6.13E-02   | 1.97E-01   | 6.21E-05   | 9.19E-03   | 6.56E-05   | 1.50E-07 | 2.30E-10   | 2.19E-01  | 5.02E-04 | 6.81E-05   | 1.26E-07   | 2.10E-02   | 6.10E-01 |
| Cobre (NC)                | 2.12E-02              | 1.19E-02           | 1.89E-06           | 2.06E-05           | 2.35E-01   | 1.32E-01   | 2.11E-05   | 2.29E-04   | 5.06E-03   | 6.96E-05 | 1.78E-08   | 5.62E-02  | 7.73E-04 | 3.15E-05   | 6.09E-05   | 6.09E-02   | 4.89E-01 |
| Hierro (NC)               | 1.10E-02              | 2.97E-02           | 8.71E-07           | 2.69E-05           | 1.58E-02   | 4.25E-02   | 1.24E-06   | 3.84E-05   | 2.60E-01   | 5.96E-03 | 9.12E-07   | 3.71E-01  | 8.51E-03 | NA         | 3.34E-06   | NA         | 4.39E-01 |
| Plomo (NC)                | 7.82E-06              | 1.39E-04           | 5.05E-10           | 6.32E-07           | 2.17E-03   | 3.87E-02   | 1.40E-07   | 1.76E-04   | 1.48E-04   | 2.04E-07 | 5.21E-10   | 4.12E-02  | 5.67E-05 | NA         | 4.91E-07   | NA         | 8.81E-02 |
| Manganeso (NC)            | 6.30E-03              | 1.70E-02           | 5.61E-06           | 4.64E-05           | 1.05E-01   | 2.83E-01   | 9.36E-05   | 7.74E-04   | 3.26E-03   | 7.47E-05 | 1.14E-08   | 5.43E-02  | 1.24E-03 | 4.06E-04   | 1.38E-08   | 2.75E-04   | 4.82E-01 |
| Mercurio (NC)             | 2.79E-06              | 1.13E-05           | 1.87E-08           | 3.73E-06           | 2.79E-02   | 1.13E-01   | 1.87E-04   | 3.73E-02   | 6.60E-07   | 1.51E-08 | 2.32E-12   | 3.30E-04  | 7.57E-06 | 1.37E-08   | 2.93E-07   | 9.75E-04   | 2.93E-01 |
| Molibdeno (NC)            | 4.59E-05              | 1.24E-04           | 2.72E-09           | 1.34E-07           | 9.18E-03   | 2.47E-02   | 5.44E-07   | 2.69E-05   | 1.94E-05   | 4.45E-08 | 6.81E-11   | 3.88E-03  | 8.89E-06 | 1.01E-08   | 4.19E-07   | 3.49E-05   | 4.21E-02 |
| Níquel (C)                | 5.79E-05              | 1.23E-03           | 9.01E-09           | 7.74E-07           | 4.82E-03   | 1.02E-01   | 7.50E-07   | 6.45E-05   | 2.47E-05   | 1.13E-06 | 8.67E-11   | 2.06E-03  | 9.44E-05 | 8.54E-06   | 6.17E-07   | 3.43E-02   | 1.48E-01 |
| Selenio (NC)              | 1.06E-05              | 2.86E-05           | 1.24E-08           | 1.09E-06           | 2.12E-03   | 5.72E-03   | 2.47E-06   | 2.17E-04   | 1.18E-05   | 2.71E-08 | 4.15E-11   | 2.36E-03  | 5.42E-06 | NA         | 3.46E-08   | NA         | 2.73E-02 |
| Vanadio (NC)              | 9.49E-05              | 2.56E-04           | 2.07E-08           | 2.39E-06           | 1.88E-02   | 5.07E-02   | 4.11E-06   | 4.75E-04   | 7.95E-04   | 1.82E-05 | 2.79E-09   | 1.58E-01  | 3.62E-03 | NA         | 3.59E-07   | NA         | 2.73E-01 |
| Zinc (NC)                 | 4.12E-03              | 1.85E-02           | 9.21E-06           | 3.64E-04           | 1.37E-02   | 6.16E-02   | 3.07E-05   | 1.21E-03   | 2.79E-04   | 6.40E-06 | 9.80E-10   | 9.31E-04  | 2.13E-05 | NA         | 3.69E-07   | NA         | 8.95E-02 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Tabla 33 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.18E-03           | 2.18E-03            | 2.72E-05              | 9.91E-06 | 2.72E-05      | 9.91E-06 | 5.14E-04      | 4.06E-04               | 5.14E-04                    | 4.06E-04 | 2.33E-03   | 2.33E-03   |
| Arsénico (C)              | 6.36E-06           | 2.12E-02            | 1.43E-06              | 5.20E-07 | 4.75E-03      | 1.73E-03 | 8.49E-07      | 2.01E-07               | 2.83E-03                    | 6.71E-04 | 2.40E-05   | 7.98E-02   |
| Bario (NC)                | 5.02E-04           | 2.51E-03            | 2.85E-06              | 1.04E-06 | 1.43E-05      | 5.20E-06 | 4.27E-07      | 3.38E-07               | 2.14E-06                    | 1.69E-06 | 2.72E-04   | 1.36E-03   |
| Cadmio (C)                | 1.27E-06           | 2.55E-03            | 4.04E-08              | 1.47E-08 | 8.08E-05      | 2.95E-05 | 1.62E-08      | 1.28E-09               | 1.62E-05                    | 1.28E-06 | 2.76E-06   | 2.76E-03   |
| Cromo (C)                 | 6.36E-06           | 2.12E-03            | 2.02E-07              | 7.36E-08 | 6.74E-05      | 2.45E-05 | 1.53E-06      | 1.21E-06               | 5.10E-04                    | 4.03E-04 | 5.01E-05   | 1.67E-02   |
| Cobalto (NC)              | 6.36E-06           | 2.12E-02            | 2.02E-07              | 2.95E-08 | 6.74E-04      | 9.82E-05 | 8.14E-07      | 6.43E-08               | 2.71E-03                    | 2.14E-04 | 4.84E-06   | 1.61E-02   |
| Cobre (NC)                | 1.24E-04           | 1.24E-03            | 2.35E-06              | 8.55E-07 | 2.35E-05      | 8.55E-06 | 6.93E-07      | 3.29E-07               | 6.93E-06                    | 3.29E-06 | 7.68E-05   | 7.68E-04   |
| Hierro (NC)               | 2.60E-03           | 3.71E-03            | 4.37E-05              | 1.59E-05 | 6.24E-05      | 2.27E-05 | 1.99E-03      | 1.57E-03               | 2.84E-03                    | 2.24E-03 | 0.00E+00   | NA         |
| Plomo (NC)                | 6.36E-06           | 1.77E-03            | 2.02E-07              | 7.36E-09 | 5.61E-05      | 2.05E-06 | 2.42E-07      | 1.15E-08               | 6.74E-05                    | 3.19E-06 | 4.84E-06   | 1.35E-03   |
| Manganeso (NC)            | 4.88E-04           | 8.14E-03            | 4.20E-06              | 1.53E-06 | 7.01E-05      | 2.55E-05 | 2.86E-05      | 2.26E-05               | 4.76E-04                    | 3.76E-04 | 8.08E-04   | 1.35E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-05            | 4.04E-09              | 1.47E-09 | 2.02E-07      | 7.36E-08 | 8.08E-10      | 6.39E-10               | 4.04E-08                    | 3.19E-08 | 1.13E-05   | 1.13E-01   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 1.87E-06              | 6.81E-07 | 3.74E-04      | 1.36E-04 | 1.48E-07      | 1.17E-08               | 2.97E-05                    | 2.35E-06 | 4.26E-06   | 8.52E-04   |
| Níquel (C)                | 6.36E-06           | 5.30E-04            | 3.26E-07              | 2.38E-08 | 2.72E-05      | 1.98E-06 | 4.96E-07      | 7.85E-07               | 4.14E-05                    | 6.54E-05 | 2.54E-05   | 2.12E-03   |
| Selenio (NC)              | 6.36E-06           | 1.27E-03            | 2.02E-07              | 7.36E-08 | 4.04E-05      | 1.47E-05 | 1.62E-08      | 1.28E-09               | 3.23E-06                    | 2.56E-07 | 7.20E-05   | 1.44E-02   |
| Vanadio (NC)              | 1.89E-05           | 3.75E-03            | 4.35E-07              | 1.59E-07 | 8.64E-05      | 3.15E-05 | 7.94E-06      | 6.28E-06               | 1.58E-03                    | 1.25E-03 | 2.79E-05   | 5.53E-03   |
| Zinc (NC)                 | 2.23E-04           | 7.43E-04            | 1.01E-06              | 2.21E-07 | 3.37E-06      | 7.36E-07 | 3.09E-06      | 2.45E-06               | 1.03E-05                    | 8.15E-06 | 3.16E-03   | 1.05E-02   |

**Tabla 33**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 4.32E-03              | 1.16E-02           | 9.73E-06           | 3.85E-04           | 4.32E-03   | 1.16E-02   | 9.73E-06   | 3.85E-04   | 8.90E-03   | 2.01E-03 | 2.12E-07   | 8.90E-03  | 2.01E-03 | 1.90E-04   | 2.56E-06   | 5.12E-04   | 3.34E-02 |
| Arsénico (C)              | 6.02E-06              | 1.62E-05           | 7.57E-10           | 4.85E-08           | 2.01E-02   | 5.41E-02   | 2.52E-06   | 1.62E-04   | 1.46E-06   | 9.90E-08 | 3.48E-11   | 4.87E-03  | 3.30E-04 | NA         | 9.86E-08   | NA         | 1.91E-01 |
| Bario (NC)                | 2.78E-03              | 4.98E-03           | 6.44E-09           | 2.03E-07           | 1.39E-02   | 2.49E-02   | 3.22E-08   | 1.01E-06   | 1.90E-05   | 4.29E-06 | 4.53E-10   | 9.49E-05  | 2.14E-05 | 4.05E-06   | 3.13E-07   | 6.25E-04   | 4.34E-02 |
| Cadmio (C)                | 2.06E-05              | 5.55E-05           | 8.20E-11           | 1.73E-08           | 2.06E-02   | 5.55E-02   | 8.20E-08   | 1.73E-05   | 1.79E-07   | 4.05E-09 | 4.28E-12   | 1.79E-04  | 4.05E-06 | NA         | 2.89E-07   | NA         | 8.17E-02 |
| Cromo (C)                 | 6.59E-05              | 7.96E-03           | 6.17E-08           | 5.19E-06           | 2.20E-02   | 2.65E+00   | 2.06E-05   | 1.73E-03   | 2.12E-05   | 4.79E-06 | 5.06E-10   | 7.07E-03  | 1.60E-03 | 2.26E-05   | 1.26E-07   | 1.26E-03   | 2.71E+00 |
| Cobalto (NC)              | 1.84E-05              | 5.91E-05           | 1.86E-08           | 2.76E-06           | 6.13E-02   | 1.97E-01   | 6.21E-05   | 9.19E-03   | 3.83E-06   | 8.65E-08 | 9.13E-11   | 1.28E-02  | 2.88E-04 | 6.81E-05   | 1.26E-07   | 2.10E-02   | 3.43E-01 |
| Cobre (NC)                | 2.12E-02              | 1.19E-02           | 1.89E-06           | 2.06E-05           | 2.12E-01   | 1.19E-01   | 1.89E-05   | 2.06E-04   | 2.95E-04   | 4.00E-05 | 7.04E-09   | 2.95E-03  | 4.00E-04 | 3.15E-05   | 6.09E-05   | 6.09E-02   | 3.97E-01 |
| Hierro (NC)               | 1.10E-02              | 2.97E-02           | 8.71E-07           | 2.69E-05           | 1.58E-02   | 4.25E-02   | 1.24E-06   | 3.84E-05   | 1.52E-02   | 3.42E-03 | 3.62E-07   | 2.17E-02  | 4.89E-03 | NA         | 3.34E-06   | NA         | 3.54E-02 |
| Plomo (NC)                | 7.82E-06              | 1.39E-04           | 5.05E-10           | 6.32E-07           | 2.17E-03   | 3.87E-02   | 1.40E-07   | 1.76E-04   | 8.66E-06   | 1.17E-07 | 2.06E-10   | 2.40E-03  | 3.26E-05 | NA         | 4.91E-07   | NA         | 4.67E-02 |
| Manganeso (NC)            | 6.30E-03              | 1.70E-02           | 5.61E-06           | 4.64E-05           | 1.05E-01   | 2.83E-01   | 9.36E-05   | 7.74E-04   | 1.90E-04   | 4.29E-05 | 4.53E-09   | 3.17E-03  | 7.15E-04 | 4.06E-04   | 1.38E-08   | 2.75E-04   | 4.16E-01 |
| Mercurio (NC)             | 2.79E-06              | 1.13E-05           | 1.87E-08           | 3.73E-06           | 2.79E-02   | 1.13E-01   | 1.87E-04   | 3.73E-02   | 3.85E-08   | 8.70E-09 | 9.19E-13   | 1.93E-06  | 4.35E-07 | 1.37E-08   | 2.93E-07   | 9.75E-04   | 2.92E-01 |
| Molibdeno (NC)            | 4.59E-05              | 1.24E-04           | 2.72E-09           | 1.34E-07           | 9.18E-03   | 2.47E-02   | 5.44E-07   | 2.69E-05   | 1.13E-06   | 2.56E-08 | 2.70E-11   | 2.26E-04  | 5.11E-06 | 1.01E-08   | 4.19E-07   | 3.49E-05   | 3.63E-02 |
| Níquel (C)                | 5.79E-05              | 1.23E-03           | 9.01E-09           | 7.74E-07           | 4.82E-03   | 1.02E-01   | 7.50E-07   | 6.45E-05   | 1.44E-06   | 6.51E-07 | 3.44E-11   | 1.20E-04  | 5.42E-05 | 8.54E-06   | 6.17E-07   | 3.43E-02   | 1.44E-01 |
| Selenio (NC)              | 1.06E-05              | 2.86E-05           | 1.24E-08           | 1.09E-06           | 2.12E-03   | 5.72E-03   | 2.47E-06   | 2.17E-04   | 6.89E-07   | 1.56E-08 | 1.64E-11   | 1.38E-04  | 3.11E-06 | NA         | 3.46E-08   | NA         | 2.39E-02 |
| Vanadio (NC)              | 9.49E-05              | 2.56E-04           | 2.07E-08           | 2.39E-06           | 1.88E-02   | 5.07E-02   | 4.11E-06   | 4.75E-04   | 4.64E-05   | 1.05E-05 | 1.11E-09   | 9.21E-03  | 2.08E-03 | NA         | 3.59E-07   | NA         | 9.36E-02 |
| Zinc (NC)                 | 4.12E-03              | 1.85E-02           | 9.21E-06           | 3.64E-04           | 1.37E-02   | 6.16E-02   | 3.07E-05   | 1.21E-03   | 1.63E-05   | 3.68E-06 | 3.88E-10   | 5.43E-05  | 1.23E-05 | NA         | 3.69E-07   | NA         | 8.79E-02 |



**Tabla 33    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|------------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                        | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR - Agua para Beber | Exposición - Al Nadar |          | ILCR- Al Nadar |          | Exposición    | Al Caminar por el Agua | ILCR - Al Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión              | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                        |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 8.73E-04           | NA                     | 1.09E-05              | 3.96E-06 | NA             | NA       | 2.06E-04      | 1.62E-04               | NA                            | NA       | 9.33E-04   | NA           |
| Arsénico (C)             | 2.55E-06           | 3.82E-06               | 5.70E-07              | 2.08E-07 | 8.56E-07       | 3.12E-07 | 3.39E-07      | 8.05E-08               | 2.26E-07                      | 1.21E-07 | 9.58E-06   | 1.44E-05     |
| Bario (NC)               | 2.01E-04           | NA                     | 1.14E-06              | 4.16E-07 | NA             | NA       | 1.71E-07      | 1.35E-07               | NA                            | NA       | 1.09E-04   | NA           |
| Cadmio (C)               | 5.09E-07           | NA                     | 1.62E-08              | 5.89E-09 | NA             | NA       | 6.47E-09      | 5.11E-10               | NA                            | NA       | 1.10E-06   | NA           |
| Cromo (C)                | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.12E-07      | 4.84E-07               | NA                            | NA       | 2.00E-05   | NA           |
| Cobalto (NC)             | 2.55E-06           | NA                     | 8.08E-08              | 1.18E-08 | NA             | NA       | 3.26E-07      | 2.57E-08               | NA                            | NA       | 1.94E-06   | NA           |
| Cobre (NC)               | 4.97E-05           | NA                     | 9.39E-07              | 3.42E-07 | NA             | NA       | 2.77E-07      | 1.31E-07               | NA                            | NA       | 3.07E-05   | NA           |
| Hierro (NC)              | 1.04E-03           | NA                     | 1.75E-05              | 6.37E-06 | NA             | NA       | 7.94E-04      | 6.28E-04               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-09 | NA             | NA       | 9.70E-08      | 4.60E-09               | NA                            | NA       | 1.94E-06   | NA           |
| Manganeso (NC)           | 1.95E-04           | NA                     | 1.68E-06              | 6.13E-07 | NA             | NA       | 1.14E-05      | 9.03E-06               | NA                            | NA       | 3.23E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                     | 1.62E-09              | 5.89E-10 | NA             | NA       | 3.23E-10      | 2.56E-10               | NA                            | NA       | 4.51E-06   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                     | 7.47E-07              | 2.72E-07 | NA             | NA       | 5.93E-08      | 4.69E-09               | NA                            | NA       | 1.70E-06   | NA           |
| Níquel (C)               | 2.55E-06           | NA                     | 1.31E-07              | 9.52E-09 | NA             | NA       | 1.99E-07      | 3.14E-07               | NA                            | NA       | 1.02E-05   | NA           |
| Selenio (NC)             | 2.55E-06           | NA                     | 8.08E-08              | 2.95E-08 | NA             | NA       | 6.47E-09      | 5.11E-10               | NA                            | NA       | 2.88E-05   | NA           |
| Vanadio (NC)             | 7.56E-06           | NA                     | 1.74E-07              | 6.34E-08 | NA             | NA       | 3.18E-06      | 2.51E-06               | NA                            | NA       | 1.11E-05   | NA           |
| Zinc (NC)                | 8.91E-05           | NA                     | 4.04E-07              | 8.84E-08 | NA             | NA       | 1.24E-06      | 9.78E-07               | NA                            | NA       | 1.26E-03   | NA           |

**Tabla 33    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidad Costera, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 1.73E-03              | 4.65E-03           | 3.89E-06           | 1.54E-04           | NA           | NA           | NA           | NA           | 3.56E-03   | 8.04E-04 | 8.50E-08   | NA        | NA       | NA         | 1.02E-06   | NA         | NA         |
| Arsénico (C)             | 2.41E-06              | 6.49E-06           | 3.03E-10           | 1.94E-08           | 3.61E-06     | 9.73E-06     | 4.54E-10     | 2.91E-08     | 5.84E-07   | 3.96E-08 | 1.39E-11   | 8.76E-07  | 5.94E-08 | 9.35E-11   | 3.94E-08   | 5.91E-08   | 3.41E-05   |
| Bario (NC)               | 1.11E-03              | 1.99E-03           | 2.58E-09           | 8.11E-08           | NA           | NA           | NA           | NA           | 7.59E-06   | 1.72E-06 | 1.81E-10   | NA        | NA       | NA         | 1.25E-07   | NA         | NA         |
| Cadmio (C)               | 8.24E-06              | 2.22E-05           | 3.28E-11           | 6.92E-09           | NA           | NA           | NA           | NA           | 7.18E-08   | 1.62E-09 | 1.71E-12   | NA        | NA       | 1.38E-11   | 1.16E-07   | 2.08E-07   | 2.08E-07   |
| Cromo (C)                | 2.64E-05              | 3.18E-03           | 2.47E-08           | 2.08E-06           | NA           | NA           | NA           | NA           | 8.48E-06   | 1.92E-06 | 2.02E-10   | NA        | NA       | 3.62E-08   | 5.03E-08   | 2.01E-06   | 2.05E-06   |
| Cobalto (NC)             | 7.35E-06              | 2.36E-05           | 7.45E-09           | 1.10E-06           | NA           | NA           | NA           | NA           | 1.53E-06   | 3.46E-08 | 3.65E-11   | NA        | NA       | NA         | 5.04E-08   | NA         | NA         |
| Cobre (NC)               | 8.47E-03              | 4.77E-03           | 7.58E-07           | 8.24E-06           | NA           | NA           | NA           | NA           | 1.18E-04   | 1.60E-05 | 2.82E-09   | NA        | NA       | NA         | 5.04E-08   | NA         | NA         |
| Hierro (NC)              | 4.42E-03              | 1.19E-02           | 3.48E-07           | 1.08E-05           | NA           | NA           | NA           | NA           | 6.06E-03   | 1.37E-03 | 1.45E-07   | NA        | NA       | NA         | 2.44E-05   | NA         | NA         |
| Plomo (NC)               | 3.13E-06              | 5.57E-05           | 2.02E-10           | 2.53E-07           | NA           | NA           | NA           | NA           | 3.46E-06   | 4.69E-08 | 8.26E-11   | NA        | NA       | NA         | 1.34E-06   | NA         | NA         |
| Manganeso (NC)           | 2.52E-03              | 6.79E-03           | 2.25E-06           | 1.86E-05           | NA           | NA           | NA           | NA           | 7.60E-05   | 1.72E-05 | 1.81E-09   | NA        | NA       | NA         | 1.97E-07   | NA         | NA         |
| Mercurio (NC)            | 1.11E-06              | 4.51E-06           | 7.48E-09           | 1.49E-06           | NA           | NA           | NA           | NA           | 1.54E-08   | 3.48E-09 | 3.68E-13   | NA        | NA       | NA         | 5.50E-09   | NA         | NA         |
| Molibdeno (NC)           | 1.84E-05              | 4.95E-05           | 1.09E-09           | 5.37E-08           | NA           | NA           | NA           | NA           | 4.53E-07   | 1.02E-08 | 1.08E-11   | NA        | NA       | NA         | 1.17E-07   | NA         | NA         |
| Níquel (C)               | 2.32E-05              | 4.91E-04           | 3.60E-09           | 3.10E-07           | NA           | NA           | NA           | NA           | 5.76E-07   | 2.60E-07 | 1.37E-11   | NA        | NA       | 2.34E-11   | 1.68E-07   | 6.37E-08   | 6.37E-08   |
| Selenio (NC)             | 4.25E-06              | 1.14E-05           | 4.95E-09           | 4.35E-07           | NA           | NA           | NA           | NA           | 2.76E-07   | 6.23E-09 | 6.57E-12   | NA        | NA       | NA         | NA         | NA         | NA         |
| Vanadio (NC)             | 3.80E-05              | 1.02E-04           | 8.28E-09           | 9.57E-07           | NA           | NA           | NA           | NA           | 1.86E-05   | 4.19E-06 | 4.43E-10   | NA        | NA       | NA         | 1.38E-08   | NA         | NA         |
| Zinc (NC)                | 1.65E-03              | 7.39E-03           | 3.68E-06           | 1.46E-04           | NA           | NA           | NA           | NA           | 6.52E-06   | 1.47E-06 | 1.55E-10   | NA        | NA       | NA         | 1.44E-07   | NA         | NA         |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 34    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 9.82E-03           | 9.82E-03            | 5.45E-04              | 6.57E-05 | 5.45E-04      | 6.57E-05 | 7.80E-02      | 6.26E-03               | 7.80E-02                    | 6.26E-03 | 1.72E-02   | 1.72E-02   |
| Arsénico (C)              | 4.58E-05           | 1.53E-01            | 2.55E-06              | 3.06E-07 | 8.48E-03      | 1.02E-03 | 1.64E-05      | 3.94E-07               | 5.46E-02                    | 1.31E-03 | 3.01E-05   | 1.00E-01   |
| Bario (NC)                | 1.20E-03           | 6.00E-03            | 6.67E-05              | 8.03E-06 | 3.33E-04      | 4.01E-05 | 4.54E-04      | 3.65E-05               | 2.27E-03                    | 1.82E-04 | 2.48E-03   | 1.24E-02   |
| Cadmio (C)                | 4.25E-06           | 8.51E-03            | 2.36E-07              | 2.85E-08 | 4.73E-04      | 5.69E-05 | 9.70E-07      | 7.78E-09               | 9.70E-04                    | 7.78E-06 | 1.28E-05   | 1.28E-02   |
| Cromo (C)                 | 1.31E-05           | 4.36E-03            | 7.27E-07              | 8.76E-08 | 2.42E-04      | 2.92E-05 | 1.48E-04      | 1.19E-05               | 4.94E-02                    | 3.96E-03 | 2.26E-04   | 7.53E-02   |
| Cobalto (NC)              | 5.45E-05           | 1.82E-01            | 3.03E-06              | 1.46E-07 | 1.01E-02      | 4.86E-04 | 8.03E-05      | 6.44E-07               | 2.68E-01                    | 2.15E-03 | 2.16E-05   | 7.18E-02   |
| Cobre (NC)                | 3.16E-04           | 3.52E-03            | 1.76E-05              | 2.12E-06 | 1.95E-04      | 2.35E-05 | 6.62E-04      | 3.19E-05               | 7.35E-03                    | 3.54E-04 | 3.73E-04   | 4.15E-03   |
| Hierro (NC)               | 1.75E-02           | 2.49E-02            | 9.70E-04              | 1.17E-04 | 1.39E-03      | 1.67E-04 | 2.01E-01      | 1.61E-02               | 2.87E-01                    | 2.30E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.53E-05           | 4.24E-03            | 8.48E-07              | 1.02E-08 | 2.36E-04      | 2.84E-06 | 5.08E-05      | 2.45E-07               | 1.41E-02                    | 6.79E-05 | 3.84E-05   | 1.07E-02   |
| Manganeso (NC)            | 1.31E-03           | 2.18E-02            | 7.27E-05              | 8.76E-06 | 1.21E-03      | 1.46E-04 | 3.55E-03      | 2.85E-04               | 5.92E-02                    | 4.75E-03 | 4.06E-03   | 6.77E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 6.06E-08              | 7.30E-09 | 3.03E-05      | 3.65E-06 | 8.17E-08      | 6.55E-09               | 4.08E-05                    | 3.28E-06 | 4.95E-06   | 4.95E-02   |
| Molibdeno (NC)            | 2.50E-04           | 5.00E-02            | 1.39E-05              | 1.67E-06 | 2.78E-03      | 3.34E-04 | 2.26E-05      | 1.81E-07               | 4.52E-03                    | 3.63E-05 | 6.25E-04   | 1.25E-01   |
| Níquel (C)                | 1.20E-05           | 1.00E-03            | 6.67E-07              | 1.61E-08 | 5.56E-05      | 1.34E-06 | 3.68E-05      | 5.90E-06               | 3.07E-03                    | 4.92E-04 | 1.41E-04   | 1.18E-02   |
| Selenio (NC)              | 2.84E-05           | 5.67E-03            | 1.58E-06              | 1.90E-07 | 3.15E-04      | 3.79E-05 | 4.64E-06      | 3.73E-08               | 9.29E-04                    | 7.45E-06 | 8.56E-05   | 1.71E-02   |
| Vanadio (NC)              | 4.69E-05           | 9.31E-03            | 2.61E-06              | 3.14E-07 | 5.17E-04      | 6.23E-05 | 5.17E-04      | 4.15E-05               | 1.03E-01                    | 8.24E-03 | 3.49E-05   | 6.92E-03   |
| Zinc (NC)                 | 1.75E-04           | 5.82E-04            | 9.70E-06              | 7.01E-07 | 3.23E-05      | 2.34E-06 | 3.85E-04      | 3.09E-05               | 1.28E-03                    | 1.03E-04 | 4.99E-03   | 1.66E-02   |

**Tabla 34**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición -<br>Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.21E-03              | 1.89E-02              | NA                    | 3.07E-05              | 9.21E-03   | 1.89E-02   | NA         | 3.07E-05   | 1.53E-01   | 1.22E-02 | 2.68E-06   | 1.53E-01  | 1.22E-02 | 9.50E-04   | 1.93E-05   | 3.86E-03   | 3.09E-01 |
| Arsénico (C)              | 1.51E-05              | 3.10E-05              | NA                    | 3.83E-09              | 5.05E-02   | 1.03E-01   | NA         | 1.28E-05   | 2.46E-05   | 5.91E-07 | 4.31E-10   | 8.19E-02  | 1.97E-03 | NA         | 6.65E-07   | NA         | 5.56E-01 |
| Bario (NC)                | 6.65E-03              | 9.07E-03              | NA                    | 1.44E-08              | 3.32E-02   | 4.53E-02   | NA         | 7.22E-08   | 3.25E-04   | 2.61E-05 | 5.71E-09   | 1.63E-03  | 1.31E-04 | 2.03E-05   | 2.25E-06   | 4.50E-03   | 1.06E-01 |
| Cadmio (C)                | 3.61E-05              | 7.39E-05              | NA                    | 1.01E-09              | 3.61E-02   | 7.39E-02   | NA         | 1.01E-06   | 2.55E-06   | 2.05E-08 | 4.48E-11   | 2.55E-03  | 2.05E-05 | NA         | 2.02E-06   | NA         | 1.35E-01 |
| Cromo (C)                 | 1.53E-04              | 1.45E-02              | NA                    | 3.12E-07              | 5.12E-02   | 4.83E+00   | NA         | 1.04E-04   | 3.61E-04   | 2.89E-05 | 6.33E-09   | 1.20E-01  | 9.64E-03 | 1.12E-04   | 2.29E-07   | 2.29E-03   | 5.15E+00 |
| Cobalto (NC)              | 4.28E-05              | 1.05E-04              | NA                    | 2.17E-07              | 1.43E-01   | 3.51E-01   | NA         | 7.22E-04   | 6.55E-05   | 5.26E-07 | 1.15E-09   | 2.18E-01  | 1.75E-03 | 3.40E-04   | 9.02E-07   | 1.50E-01   | 1.40E+00 |
| Cobre (NC)                | 5.65E-02              | 2.52E-02              | NA                    | 1.48E-06              | 6.28E-01   | 2.80E-01   | NA         | 1.65E-05   | 1.45E-03   | 7.00E-05 | 2.55E-08   | 1.62E-02  | 7.78E-04 | 4.53E-05   | 2.91E-05   | 2.91E-02   | 9.69E-01 |
| Hierro (NC)               | 2.41E-02              | 4.94E-02              | NA                    | 2.12E-06              | 3.44E-02   | 7.06E-02   | NA         | 3.03E-06   | 2.60E-01   | 2.09E-02 | 4.56E-06   | 3.71E-01  | 2.98E-02 | NA         | 2.58E-05   | NA         | 7.37E-01 |
| Plomo (NC)                | 1.94E-05              | 2.56E-04              | NA                    | 5.04E-08              | 5.38E-03   | 7.10E-02   | NA         | 1.40E-05   | 1.46E-04   | 7.03E-07 | 2.56E-09   | 4.06E-02  | 1.95E-04 | NA         | 3.05E-06   | NA         | 1.47E-01 |
| Manganeso (NC)            | 1.51E-02              | 3.09E-02              | NA                    | 3.50E-06              | 2.51E-01   | 5.15E-01   | NA         | 5.84E-05   | 3.26E-03   | 2.61E-04 | 5.72E-08   | 5.43E-02  | 4.36E-03 | 2.03E-03   | 1.13E-07   | 2.26E-03   | 9.83E-01 |
| Mercurio (NC)             | 4.24E-06              | 1.38E-05              | NA                    | 2.14E-07              | 4.24E-02   | 1.38E-01   | NA         | 2.14E-03   | 5.77E-07   | 4.63E-08 | 1.01E-11   | 2.89E-04  | 2.32E-05 | 5.99E-08   | 2.10E-06   | 6.99E-03   | 2.40E-01 |
| Molibdeno (NC)            | 1.08E-04              | 2.21E-04              | NA                    | 8.92E-09              | 2.15E-02   | 4.41E-02   | NA         | 1.78E-06   | 1.94E-05   | 1.56E-07 | 3.40E-10   | 3.88E-03  | 3.11E-05 | 5.03E-08   | 3.01E-06   | 2.51E-04   | 2.52E-01 |
| Níquel (C)                | 1.37E-04              | 2.22E-03              | NA                    | 4.42E-08              | 1.14E-02   | 1.85E-01   | NA         | 3.68E-06   | 2.45E-05   | 3.92E-06 | 4.29E-10   | 2.04E-03  | 3.27E-04 | 4.23E-05   | 4.42E-06   | 2.46E-01   | 4.61E-01 |
| Selenio (NC)              | 2.91E-05              | 5.97E-05              | NA                    | 9.04E-08              | 5.82E-03   | 1.19E-02   | NA         | 1.81E-05   | 1.06E-05   | 8.54E-08 | 1.87E-10   | 2.13E-03  | 1.71E-05 | NA         | 1.95E-07   | NA         | 4.40E-02 |
| Vanadio (NC)              | 2.28E-04              | 4.67E-04              | NA                    | 1.90E-07              | 4.52E-02   | 9.26E-02   | NA         | 3.76E-05   | 7.87E-04   | 6.32E-05 | 1.38E-08   | 1.56E-01  | 1.25E-02 | NA         | 6.67E-07   | NA         | 4.34E-01 |
| Zinc (NC)                 | 9.82E-03              | 3.35E-02              | NA                    | 2.47E-05              | 3.27E-02   | 1.12E-01   | NA         | 8.23E-05   | 2.79E-04   | 2.24E-05 | 4.89E-09   | 9.30E-04  | 7.46E-05 | NA         | 2.65E-06   | NA         | 1.64E-01 |

<sup>(a)</sup>      Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:    Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 35    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 5.73E-03           | 5.73E-03            | 1.27E-04              | 4.64E-05 | 1.27E-04      | 4.64E-05 | 4.55E-03      | 3.60E-03               | 4.55E-03                    | 3.60E-03 | 4.02E-03   | 4.02E-03   |
| Arsénico (C)              | 2.67E-05           | 8.91E-02            | 5.94E-07              | 2.16E-07 | 1.98E-03      | 7.22E-04 | 9.55E-07      | 2.27E-07               | 3.18E-03                    | 7.55E-04 | 7.01E-06   | 2.34E-02   |
| Bario (NC)                | 7.00E-04           | 3.50E-03            | 1.56E-05              | 5.67E-06 | 7.78E-05      | 2.83E-05 | 2.65E-05      | 2.10E-05               | 1.33E-04                    | 1.05E-04 | 5.79E-04   | 2.89E-03   |
| Cadmio (C)                | 2.48E-06           | 4.96E-03            | 5.52E-08              | 2.01E-08 | 1.10E-04      | 4.02E-05 | 5.66E-08      | 4.47E-09               | 5.66E-05                    | 4.47E-06 | 2.99E-06   | 2.99E-03   |
| Cromo (C)                 | 7.64E-06           | 2.55E-03            | 1.70E-07              | 6.19E-08 | 5.66E-05      | 2.06E-05 | 8.65E-06      | 6.83E-06               | 2.88E-03                    | 2.28E-03 | 5.27E-05   | 1.76E-02   |
| Cobalto (NC)              | 3.18E-05           | 1.06E-01            | 7.07E-07              | 1.03E-07 | 2.36E-03      | 3.44E-04 | 4.68E-06      | 3.70E-07               | 1.56E-02                    | 1.23E-03 | 5.03E-06   | 1.68E-02   |
| Cobre (NC)                | 1.85E-04           | 1.85E-03            | 4.10E-06              | 1.49E-06 | 4.10E-05      | 1.49E-05 | 3.86E-05      | 1.83E-05               | 3.86E-04                    | 1.83E-04 | 8.71E-05   | 8.71E-04   |
| Hierro (NC)               | 1.02E-02           | 1.45E-02            | 2.26E-04              | 8.25E-05 | 3.23E-04      | 1.18E-04 | 1.17E-02      | 9.26E-03               | 1.67E-02                    | 1.32E-02 | 0.00E+00   | 0.00E+00   |
| Plomo (NC)                | 8.91E-06           | 2.48E-03            | 1.98E-07              | 7.22E-09 | 5.50E-05      | 2.00E-06 | 2.96E-06      | 1.41E-07               | 8.23E-04                    | 3.91E-05 | 8.96E-06   | 2.49E-03   |
| Manganeso (NC)            | 7.64E-04           | 1.27E-02            | 1.70E-05              | 6.19E-06 | 2.83E-04      | 1.03E-04 | 2.07E-04      | 1.64E-04               | 3.45E-03                    | 2.73E-03 | 9.48E-04   | 1.58E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-05            | 1.41E-08              | 5.15E-09 | 7.07E-07      | 2.58E-07 | 4.76E-09      | 3.77E-09               | 2.38E-07                    | 1.88E-07 | 1.15E-06   | 1.15E-02   |
| Molibdeno (NC)            | 1.46E-04           | 2.92E-02            | 3.24E-06              | 1.18E-06 | 6.48E-04      | 2.36E-04 | 1.32E-06      | 1.04E-07               | 2.64E-04                    | 2.08E-05 | 1.46E-04   | 2.92E-02   |
| Níquel (C)                | 7.00E-06           | 5.83E-04            | 1.56E-07              | 1.13E-08 | 1.30E-05      | 9.45E-07 | 2.15E-06      | 3.39E-06               | 1.79E-04                    | 2.83E-04 | 3.30E-05   | 2.75E-03   |
| Selenio (NC)              | 1.65E-05           | 3.31E-03            | 3.68E-07              | 1.34E-07 | 7.36E-05      | 2.68E-05 | 2.71E-07      | 2.14E-08               | 5.42E-05                    | 4.28E-06 | 2.00E-05   | 3.99E-03   |
| Vanadio (NC)              | 2.74E-05           | 5.43E-03            | 6.08E-07              | 2.22E-07 | 1.21E-04      | 4.40E-05 | 3.02E-05      | 2.39E-05               | 5.99E-03                    | 4.73E-03 | 8.14E-06   | 1.61E-03   |
| Zinc (NC)                 | 1.02E-04           | 3.39E-04            | 2.26E-06              | 4.95E-07 | 7.54E-06      | 1.65E-06 | 2.25E-05      | 1.78E-05               | 7.49E-05                    | 5.92E-05 | 1.17E-03   | 3.88E-03   |

**Tabla 35    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 9.21E-03              | 1.89E-02           | NA                 | 3.07E-05           | 9.21E-03   | 1.89E-02   | NA         | 3.07E-05   | 8.90E-03   | 7.04E-03 | 1.06E-06   | 8.90E-03  | 7.04E-03 | 9.50E-04   | 1.93E-05   | 3.86E-03   | 6.60E-02 |
| Arsénico (C)              | 1.51E-05              | 3.10E-05           | NA                 | 3.83E-09           | 5.05E-02   | 1.03E-01   | NA         | 1.28E-05   | 1.43E-06   | 3.40E-07 | 1.71E-10   | 4.78E-03  | 1.13E-03 | NA         | 6.65E-07   | NA         | 2.79E-01 |
| Bario (NC)                | 6.65E-03              | 9.07E-03           | NA                 | 1.44E-08           | 3.32E-02   | 4.53E-02   | NA         | 7.22E-08   | 1.90E-05   | 1.50E-05 | 2.26E-09   | 9.49E-05  | 7.50E-05 | 2.03E-05   | 2.25E-06   | 4.50E-03   | 9.00E-02 |
| Cadmio (C)                | 3.61E-05              | 7.39E-05           | NA                 | 1.01E-09           | 3.61E-02   | 7.39E-02   | NA         | 1.01E-06   | 1.49E-07   | 1.18E-08 | 1.78E-11   | 1.49E-04  | 1.18E-05 | NA         | 2.02E-06   | NA         | 1.18E-01 |
| Cromo (C)                 | 1.53E-04              | 1.45E-02           | NA                 | 3.12E-07           | 5.12E-02   | 4.83E+00   | NA         | 1.04E-04   | 2.10E-05   | 1.66E-05 | 2.51E-09   | 7.01E-03  | 5.54E-03 | 1.12E-04   | 2.29E-07   | 2.29E-03   | 4.92E+00 |
| Cobalto (NC)              | 4.28E-05              | 1.05E-04           | NA                 | 2.17E-07           | 1.43E-01   | 3.51E-01   | NA         | 7.22E-04   | 3.82E-06   | 3.02E-07 | 4.56E-10   | 1.27E-02  | 1.01E-03 | 3.40E-04   | 9.02E-07   | 1.50E-01   | 8.01E-01 |
| Cobre (NC)                | 5.65E-02              | 2.52E-02           | NA                 | 1.48E-06           | 5.65E-01   | 2.52E-01   | NA         | 1.48E-05   | 8.48E-05   | 4.02E-05 | 1.01E-08   | 8.48E-04  | 4.02E-04 | 4.53E-05   | 2.91E-05   | 2.91E-02   | 8.50E-01 |
| Hierro (NC)               | 2.41E-02              | 4.94E-02           | NA                 | 2.12E-06           | 3.44E-02   | 7.06E-02   | NA         | 3.03E-06   | 1.52E-02   | 1.20E-02 | 1.81E-06   | 2.17E-02  | 1.71E-02 | NA         | 2.58E-05   | NA         | 8.37E-02 |
| Plomo (NC)                | 1.94E-05              | 2.56E-04           | NA                 | 5.04E-08           | 5.38E-03   | 7.10E-02   | NA         | 1.40E-05   | 8.52E-06   | 4.04E-07 | 1.02E-09   | 2.37E-03  | 1.12E-04 | NA         | 3.05E-06   | NA         | 8.48E-02 |
| Manganeso (NC)            | 1.51E-02              | 3.09E-02           | NA                 | 3.50E-06           | 2.51E-01   | 5.15E-01   | NA         | 5.84E-05   | 1.90E-04   | 1.50E-04 | 2.27E-08   | 3.17E-03  | 2.50E-03 | 2.03E-03   | 1.13E-07   | 2.26E-03   | 8.11E-01 |
| Mercurio (NC)             | 4.24E-06              | 1.38E-05           | NA                 | 2.14E-07           | 4.24E-02   | 1.38E-01   | NA         | 2.14E-03   | 3.37E-08   | 2.66E-08 | 4.02E-12   | 1.68E-06  | 1.33E-06 | 5.99E-08   | 2.10E-06   | 6.99E-03   | 2.01E-01 |
| Molibdeno (NC)            | 1.08E-04              | 2.21E-04           | NA                 | 8.92E-09           | 2.15E-02   | 4.41E-02   | NA         | 1.78E-06   | 1.13E-06   | 8.95E-08 | 1.35E-10   | 2.26E-04  | 1.79E-05 | 5.03E-08   | 3.01E-06   | 2.51E-04   | 1.26E-01 |
| Níquel (C)                | 1.37E-04              | 2.22E-03           | NA                 | 4.42E-08           | 1.14E-02   | 1.85E-01   | NA         | 3.68E-06   | 1.43E-06   | 2.26E-06 | 1.70E-10   | 1.19E-04  | 1.88E-04 | 4.23E-05   | 4.42E-06   | 2.46E-01   | 4.46E-01 |
| Selenio (NC)              | 2.91E-05              | 5.97E-05           | NA                 | 9.04E-08           | 5.82E-03   | 1.19E-02   | NA         | 1.81E-05   | 6.21E-07   | 4.91E-08 | 7.41E-11   | 1.24E-04  | 9.82E-06 | NA         | 1.95E-07   | NA         | 2.54E-02 |
| Vanadio (NC)              | 2.28E-04              | 4.67E-04           | NA                 | 1.90E-07           | 4.52E-02   | 9.26E-02   | NA         | 3.76E-05   | 4.59E-05   | 3.63E-05 | 5.48E-09   | 9.11E-03  | 7.20E-03 | NA         | 6.67E-07   | NA         | 1.72E-01 |
| Zinc (NC)                 | 9.82E-03              | 3.35E-02           | NA                 | 2.47E-05           | 3.27E-02   | 1.12E-01   | NA         | 8.23E-05   | 1.63E-05   | 1.29E-05 | 1.94E-09   | 5.42E-05  | 4.29E-05 | NA         | 2.65E-06   | NA         | 1.49E-01 |

**Tabla 35    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - AI Nadar |          | ILCR- AI Nadar |          | Exposición    | AI Caminar por el Agua | ILCR - AI Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 2.29E-03           | NA                    | 5.09E-05              | 1.86E-05 | NA             | NA       | 1.82E-03      | 1.44E-03               | NA                            | NA       | 6.88E-03   | NA           |
| Arsénico (C)             | 1.07E-05           | 1.60E-05              | 2.38E-07              | 8.66E-08 | 3.56E-07       | 1.30E-07 | 3.82E-07      | 9.06E-08               | 5.73E-07                      | 1.36E-07 | 1.20E-05   | 1.80E-05     |
| Bario (NC)               | 2.80E-04           | NA                    | 6.22E-06              | 2.27E-06 | NA             | NA       | 1.06E-05      | 8.38E-06               | NA                            | NA       | 9.92E-04   | NA           |
| Cadmio (C)               | 9.93E-07           | NA                    | 2.21E-08              | 8.04E-09 | NA             | NA       | 2.26E-08      | 1.79E-09               | NA                            | NA       | 5.12E-06   | NA           |
| Cromo (C)                | 3.06E-06           | NA                    | 6.79E-08              | 2.47E-08 | NA             | NA       | 3.46E-06      | 2.73E-06               | NA                            | NA       | 9.03E-05   | NA           |
| Cobalto (NC)             | 1.27E-05           | NA                    | 2.83E-07              | 4.12E-08 | NA             | NA       | 1.87E-06      | 1.48E-07               | NA                            | NA       | 8.62E-06   | NA           |
| Cobre (NC)               | 7.38E-05           | NA                    | 1.64E-06              | 5.98E-07 | NA             | NA       | 1.54E-05      | 7.33E-06               | NA                            | NA       | 1.49E-04   | NA           |
| Hierro (NC)              | 4.07E-03           | NA                    | 9.05E-05              | 3.30E-05 | NA             | NA       | 4.68E-03      | 3.70E-03               | NA                            | NA       | 0.00E+00   | NA           |
| Plomo (NC)               | 3.56E-06           | NA                    | 7.92E-08              | 2.89E-09 | NA             | NA       | 1.19E-06      | 5.62E-08               | NA                            | NA       | 1.54E-05   | NA           |
| Manganeso (NC)           | 3.06E-04           | NA                    | 6.79E-06              | 2.47E-06 | NA             | NA       | 8.29E-05      | 6.55E-05               | NA                            | NA       | 1.62E-03   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 5.66E-09              | 2.06E-09 | NA             | NA       | 1.91E-09      | 1.51E-09               | NA                            | NA       | 1.98E-06   | NA           |
| Molibdeno (NC)           | 5.83E-05           | NA                    | 1.30E-06              | 4.72E-07 | NA             | NA       | 5.27E-07      | 4.17E-08               | NA                            | NA       | 2.50E-04   | NA           |
| Níquel (C)               | 2.80E-06           | NA                    | 6.22E-08              | 4.54E-09 | NA             | NA       | 8.59E-07      | 1.36E-06               | NA                            | NA       | 5.66E-05   | NA           |
| Selenio (NC)             | 6.62E-06           | NA                    | 1.47E-07              | 5.36E-08 | NA             | NA       | 1.08E-07      | 8.57E-09               | NA                            | NA       | 3.42E-05   | NA           |
| Vanadio (NC)             | 1.09E-05           | NA                    | 2.43E-07              | 8.87E-08 | NA             | NA       | 1.21E-05      | 9.54E-06               | NA                            | NA       | 1.40E-05   | NA           |
| Zinc (NC)                | 4.07E-05           | NA                    | 9.05E-07              | 1.98E-07 | NA             | NA       | 8.99E-06      | 7.10E-06               | NA                            | NA       | 2.00E-03   | NA           |

**Tabla 35    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Indígenas, Proyecto Mina de Cobre Panamá, caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 3.68E-03              | 7.55E-03           | NA                 | 1.23E-05           | NA           | NA           | NA           | NA           | 3.56E-03   | 2.82E-03 | 4.25E-07   | NA        | NA       | NA         | 7.72E-06   | NA         | NA         |
| Arsénico (C)             | 6.06E-06              | 1.24E-05           | NA                 | 1.53E-09           | 9.08E-06     | 1.86E-05     | NA           | 2.30E-09     | 5.84E-07   | 1.39E-07 | 6.97E-11   | 8.76E-07  | 2.08E-07 | 4.68E-10   | 2.66E-07   | 3.99E-07   | 6.45E-05   |
| Bario (NC)               | 2.66E-03              | 3.63E-03           | NA                 | 5.77E-09           | NA           | NA           | NA           | NA           | 7.59E-06   | 6.00E-06 | 9.06E-10   | NA        | NA       | NA         | 9.00E-07   | NA         | NA         |
| Cadmio (C)               | 1.44E-05              | 2.96E-05           | NA                 | 4.03E-10           | NA           | NA           | NA           | NA           | 7.18E-08   | 5.67E-09 | 8.56E-12   | NA        | NA       | 6.90E-11   | 8.07E-07   | 1.45E-06   | 1.45E-06   |
| Cromo (C)                | 6.14E-05              | 5.80E-03           | NA                 | 1.25E-07           | NA           | NA           | NA           | NA           | 8.48E-06   | 6.71E-06 | 1.01E-09   | NA        | NA       | 1.81E-07   | 9.18E-08   | 3.67E-06   | 3.85E-06   |
| Cobalto (NC)             | 1.71E-05              | 4.21E-05           | NA                 | 8.67E-08           | NA           | NA           | NA           | NA           | 1.53E-06   | 1.21E-07 | 1.83E-10   | NA        | NA       | NA         | 3.61E-07   | NA         | NA         |
| Cobre (NC)               | 2.26E-02              | 1.01E-02           | NA                 | 5.93E-07           | NA           | NA           | NA           | NA           | 1.18E-04   | 5.60E-05 | 1.41E-08   | NA        | NA       | NA         | 1.16E-05   | NA         | NA         |
| Hierro (NC)              | 9.64E-03              | 1.98E-02           | NA                 | 8.48E-07           | NA           | NA           | NA           | NA           | 6.06E-03   | 4.79E-03 | 7.23E-07   | NA        | NA       | NA         | 1.03E-05   | NA         | NA         |
| Plomo (NC)               | 7.75E-06              | 1.02E-04           | NA                 | 2.02E-08           | NA           | NA           | NA           | NA           | 3.46E-06   | 1.64E-07 | 4.13E-10   | NA        | NA       | NA         | 1.22E-06   | NA         | NA         |
| Manganeso (NC)           | 6.02E-03              | 1.23E-02           | NA                 | 1.40E-06           | NA           | NA           | NA           | NA           | 7.60E-05   | 6.01E-05 | 9.07E-09   | NA        | NA       | NA         | 4.51E-08   | NA         | NA         |
| Mercurio (NC)            | 1.70E-06              | 5.50E-06           | NA                 | 8.55E-08           | NA           | NA           | NA           | NA           | 1.54E-08   | 1.22E-08 | 1.84E-12   | NA        | NA       | NA         | 8.39E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.31E-05              | 8.83E-05           | NA                 | 3.57E-09           | NA           | NA           | NA           | NA           | 4.53E-07   | 3.58E-08 | 5.40E-11   | NA        | NA       | NA         | 1.20E-06   | NA         | NA         |
| Níquel (C)               | 5.46E-05              | 8.89E-04           | NA                 | 1.77E-08           | NA           | NA           | NA           | NA           | 5.76E-07   | 9.11E-07 | 6.87E-11   | NA        | NA       | 1.17E-10   | 1.77E-06   | 6.72E-07   | 6.72E-07   |
| Selenio (NC)             | 1.16E-05              | 2.39E-05           | NA                 | 3.61E-08           | NA           | NA           | NA           | NA           | 2.76E-07   | 2.18E-08 | 3.29E-11   | NA        | NA       | NA         | 7.79E-08   | NA         | NA         |
| Vanadio (NC)             | 9.11E-05              | 1.87E-04           | NA                 | 7.58E-08           | NA           | NA           | NA           | NA           | 1.86E-05   | 1.47E-05 | 2.21E-09   | NA        | NA       | NA         | 2.67E-07   | NA         | NA         |
| Zinc (NC)                | 3.93E-03              | 1.34E-02           | NA                 | 9.88E-06           | NA           | NA           | NA           | NA           | 6.52E-06   | 5.15E-06 | 7.77E-10   | NA        | NA       | NA         | 1.06E-06   | NA         | NA         |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

         Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)



**Tabla 36    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| Metales                   |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 3.74E-03           | 3.74E-03            | 7.58E-04              | 9.12E-05 | 7.58E-04      | 9.12E-05 | 5.57E-02      | 4.47E-03               | 5.57E-02                    | 4.47E-03 | 2.49E-03   | 2.49E-03   |
| Arsénico (C)              | 1.09E-05           | 3.64E-02            | 2.60E-06              | 3.13E-07 | 8.66E-03      | 1.04E-03 | 1.17E-05      | 2.82E-07               | 3.90E-02                    | 9.38E-04 | 7.37E-06   | 2.46E-02   |
| Bario (NC)                | 8.60E-04           | 4.30E-03            | 5.41E-05              | 6.52E-06 | 2.71E-04      | 3.26E-05 | 3.25E-04      | 2.61E-05               | 1.62E-03                    | 1.30E-04 | 3.98E-04   | 1.99E-03   |
| Cadmio (C)                | 2.18E-06           | 4.36E-03            | 1.19E-07              | 1.43E-08 | 2.38E-04      | 2.87E-05 | 6.93E-07      | 5.56E-09               | 6.93E-04                    | 5.56E-06 | 1.76E-06   | 1.76E-03   |
| Cromo (C)                 | 1.09E-05           | 3.64E-03            | 8.66E-07              | 1.04E-07 | 2.89E-04      | 3.47E-05 | 1.06E-04      | 8.49E-06               | 3.53E-02                    | 2.83E-03 | 3.26E-05   | 1.09E-02   |
| Cobalto (NC)              | 1.09E-05           | 3.64E-02            | 2.16E-06              | 1.04E-07 | 7.22E-03      | 3.47E-04 | 5.73E-05      | 4.60E-07               | 1.91E-01                    | 1.53E-03 | 2.72E-06   | 9.08E-03   |
| Cobre (NC)                | 2.13E-04           | 2.37E-03            | 1.08E-05              | 1.30E-06 | 1.20E-04      | 1.45E-05 | 4.73E-04      | 2.28E-05               | 5.25E-03                    | 2.53E-04 | 4.90E-05   | 5.44E-04   |
| Hierro (NC)               | 4.45E-03           | 6.36E-03            | 7.58E-04              | 9.12E-05 | 1.08E-03      | 1.30E-04 | 1.43E-01      | 1.15E-02               | 2.05E-01                    | 1.64E-02 | 0.00E+00   | NA         |
| Plomo (NC)                | 1.09E-05           | 3.03E-03            | 6.49E-07              | 7.82E-09 | 1.80E-04      | 2.17E-06 | 3.63E-05      | 1.75E-07               | 1.01E-02                    | 4.85E-05 | 5.54E-06   | 1.54E-03   |
| Manganeso (NC)            | 8.37E-04           | 1.39E-02            | 7.03E-05              | 8.47E-06 | 1.17E-03      | 1.41E-04 | 2.54E-03      | 2.04E-04               | 4.23E-02                    | 3.39E-03 | 6.10E-04   | 1.02E-02   |
| Mercurio (NC)             | 1.09E-06           | 5.45E-04            | 4.33E-08              | 5.21E-09 | 2.16E-05      | 2.61E-06 | 5.83E-08      | 4.68E-09               | 2.92E-05                    | 2.34E-06 | 7.15E-07   | 7.15E-03   |
| Molibdeno (NC)            | 5.45E-06           | 1.09E-03            | 1.14E-05              | 1.37E-06 | 2.27E-03      | 2.74E-04 | 1.61E-05      | 1.30E-07               | 3.23E-03                    | 2.59E-05 | 4.19E-05   | 8.37E-03   |
| Níquel (C)                | 1.09E-05           | 9.09E-04            | 7.58E-07              | 1.82E-08 | 6.31E-05      | 1.52E-06 | 2.63E-05      | 4.22E-06               | 2.19E-03                    | 3.51E-04 | 1.86E-05   | 1.55E-03   |
| Talio (NC)                | 1.09E-05           | 2.18E-03            | 1.08E-06              | 1.30E-07 | 2.16E-04      | 2.61E-05 | 3.32E-06      | 2.66E-08               | 6.63E-04                    | 5.32E-06 | 1.16E-05   | 2.32E-03   |
| Vanadio (NC)              | 3.24E-05           | 6.43E-03            | 2.16E-06              | 2.61E-07 | 4.29E-04      | 5.17E-05 | 3.69E-04      | 2.96E-05               | 7.33E-02                    | 5.88E-03 | 5.04E-06   | 1.00E-03   |
| Zinc (NC)                 | 3.82E-04           | 1.27E-03            | 7.03E-06              | 5.08E-07 | 2.34E-05      | 1.69E-06 | 2.75E-04      | 2.21E-05               | 9.17E-04                    | 7.36E-05 | 8.26E-04   | 2.75E-03   |

**Tabla 36**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para niños Pequeños, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.05E-02              | 1.94E-02           | NA                 | 1.15E-04           | 1.05E-02   | 1.94E-02   | NA         | 1.15E-04   | 1.53E-01   | 8.76E-03 | 2.68E-06   | 1.53E-01  | 8.76E-03 | 9.52E-04   | 4.70E-05   | 9.40E-03   | 2.69E-01 |
| Arsénico (C)              | 1.46E-05              | 2.70E-05           | NA                 | 1.45E-08           | 4.88E-02   | 9.01E-02   | NA         | 4.84E-05   | 2.44E-05   | 4.20E-07 | 4.29E-10   | 8.14E-02  | 1.40E-03 | NA         | 7.21E-07   | NA         | 3.32E-01 |
| Bario (NC)                | 6.76E-03              | 8.30E-03           | NA                 | 6.07E-08           | 3.38E-02   | 4.15E-02   | NA         | 3.03E-07   | 3.26E-04   | 1.87E-05 | 5.72E-09   | 1.63E-03  | 9.35E-05 | 2.03E-05   | 2.52E-06   | 5.04E-03   | 9.04E-02 |
| Cadmio (C)                | 5.01E-05              | 9.25E-05           | NA                 | 5.17E-09           | 5.01E-02   | 9.25E-02   | NA         | 5.17E-06   | 3.24E-06   | 1.86E-08 | 5.69E-11   | 3.24E-03  | 1.86E-05 | NA         | 2.26E-06   | NA         | 1.53E-01 |
| Cromo (C)                 | 1.60E-04              | 1.33E-02           | NA                 | 1.55E-06           | 5.34E-02   | 4.42E+00   | NA         | 5.18E-04   | 3.61E-04   | 2.07E-05 | 6.34E-09   | 1.20E-01  | 6.90E-03 | 1.12E-04   | 3.53E-07   | 3.53E-03   | 4.66E+00 |
| Cobalto (NC)              | 4.47E-05              | 9.85E-05           | NA                 | 8.24E-07           | 1.49E-01   | 3.28E-01   | NA         | 2.75E-03   | 6.57E-05   | 3.77E-07 | 1.15E-09   | 2.19E-01  | 1.26E-03 | 3.41E-04   | 1.01E-06   | 1.68E-01   | 1.11E+00 |
| Cobre (NC)                | 5.15E-02              | 1.99E-02           | NA                 | 6.16E-06           | 5.72E-01   | 2.21E-01   | NA         | 6.84E-05   | 1.32E-03   | 4.55E-05 | 2.32E-08   | 1.47E-02  | 5.05E-04 | 4.11E-05   | 1.96E-05   | 1.96E-02   | 8.36E-01 |
| Hierro (NC)               | 2.69E-02              | 4.96E-02           | NA                 | 8.04E-06           | 3.84E-02   | 7.08E-02   | NA         | 1.15E-05   | 2.60E-01   | 1.49E-02 | 4.57E-06   | 3.72E-01  | 2.13E-02 | NA         | 8.21E-05   | NA         | 6.22E-01 |
| Plomo (NC)                | 1.90E-05              | 2.32E-04           | NA                 | 1.89E-07           | 5.28E-03   | 6.44E-02   | NA         | 5.25E-05   | 1.46E-04   | 5.02E-07 | 2.56E-09   | 4.05E-02  | 1.39E-04 | NA         | 3.31E-06   | NA         | 1.25E-01 |
| Manganeso (NC)            | 1.53E-02              | 2.83E-02           | NA                 | 1.39E-05           | 2.56E-01   | 4.72E-01   | NA         | 2.31E-04   | 3.26E-03   | 1.87E-04 | 5.73E-08   | 5.44E-02  | 3.12E-03 | 2.03E-03   | 1.05E-06   | 2.10E-02   | 8.79E-01 |
| Mercurio (NC)             | 6.78E-06              | 1.88E-05           | NA                 | 1.12E-06           | 6.78E-02   | 1.88E-01   | NA         | 1.12E-02   | 7.85E-07   | 4.50E-08 | 1.38E-11   | 3.93E-04  | 2.25E-05 | 8.15E-08   | 2.28E-06   | 7.60E-03   | 2.83E-01 |
| Molibdeno (NC)            | 1.12E-04              | 2.06E-04           | NA                 | 4.02E-08           | 2.23E-02   | 4.12E-02   | NA         | 8.04E-06   | 1.96E-05   | 1.13E-07 | 3.44E-10   | 3.93E-03  | 2.25E-05 | 5.09E-08   | 3.29E-06   | 2.74E-04   | 8.31E-02 |
| Níquel (C)                | 1.41E-04              | 2.05E-03           | NA                 | 2.32E-07           | 1.17E-02   | 1.71E-01   | NA         | 1.93E-05   | 2.47E-05   | 2.83E-06 | 4.33E-10   | 2.06E-03  | 2.36E-04 | 4.27E-05   | 4.81E-06   | 2.67E-01   | 4.57E-01 |
| Talio (NC)                | 2.58E-05              | 4.77E-05           | NA                 | 3.25E-07           | 5.17E-03   | 9.54E-03   | NA         | 6.50E-05   | 1.01E-05   | 5.80E-08 | 1.78E-10   | 2.02E-03  | 1.16E-05 | NA         | 2.09E-07   | NA         | 2.15E-02 |
| Vanadio (NC)              | 2.31E-04              | 4.26E-04           | NA                 | 7.15E-07           | 4.58E-02   | 8.46E-02   | NA         | 1.42E-04   | 7.87E-04   | 4.51E-05 | 1.38E-08   | 1.56E-01  | 8.95E-03 | NA         | 7.73E-07   | NA         | 3.83E-01 |
| Zinc (NC)                 | 1.00E-02              | 3.08E-02           | NA                 | 1.09E-04           | 3.34E-02   | 1.03E-01   | NA         | 3.63E-04   | 2.81E-04   | 1.61E-05 | 4.92E-09   | 9.35E-04  | 5.36E-05 | NA         | 3.08E-06   | NA         | 1.42E-01 |

<sup>(a)</sup>      Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

**Tabla 37    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

| Evaluación no Cancerígena |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
|---------------------------|--------------------|---------------------|-----------------------|----------|---------------|----------|---------------|------------------------|-----------------------------|----------|------------|------------|
| Parámetro <sup>(a)</sup>  | A. Agua para Beber |                     | B. Agua Superficial   |          |               |          | C. Sedimentos |                        |                             |          | D. Peces   |            |
|                           | Exposición         | CP -Agua Para Beber | Exposición - Al Nadar |          | CP - Al Nadar |          | Exposición    | Al Caminar por el Agua | CP - Al Caminar por el Agua |          | Exposición | CP - Peces |
|                           | Ingestión          | Ingestión           | Ingestión             | Dérmica  | Ingestión     | Dérmica  | Ingestión     | Dérmica                | Ingestión                   | Dérmica  | Ingestión  | Ingestión  |
| <b>Metales</b>            |                    |                     |                       |          |               |          |               |                        |                             |          |            |            |
| Aluminio (NC)             | 2.18E-03           | 2.18E-03            | 1.77E-04              | 6.44E-05 | 1.77E-04      | 6.44E-05 | 3.25E-03      | 2.57E-03               | 3.25E-03                    | 2.57E-03 | 2.49E-03   | 2.49E-03   |
| Arsénico (C)              | 6.36E-06           | 2.12E-02            | 6.06E-07              | 2.21E-07 | 2.02E-03      | 7.36E-04 | 6.82E-07      | 1.62E-07               | 2.27E-03                    | 5.39E-04 | 7.37E-06   | 2.46E-02   |
| Bario (NC)                | 5.02E-04           | 2.51E-03            | 1.26E-05              | 4.60E-06 | 6.31E-05      | 2.30E-05 | 1.89E-05      | 1.50E-05               | 9.47E-05                    | 7.49E-05 | 3.98E-04   | 1.99E-03   |
| Cadmio (C)                | 1.27E-06           | 2.55E-03            | 2.78E-08              | 1.01E-08 | 5.56E-05      | 2.02E-05 | 4.04E-08      | 3.19E-09               | 4.04E-05                    | 3.19E-06 | 1.76E-06   | 1.76E-03   |
| Cromo (C)                 | 6.36E-06           | 2.12E-03            | 2.02E-07              | 7.36E-08 | 6.74E-05      | 2.45E-05 | 6.18E-06      | 4.88E-06               | 2.06E-03                    | 1.63E-03 | 3.26E-05   | 1.09E-02   |
| Cobalto (NC)              | 6.36E-06           | 2.12E-02            | 5.05E-07              | 7.36E-08 | 1.68E-03      | 2.45E-04 | 3.34E-06      | 2.64E-07               | 1.11E-02                    | 8.81E-04 | 2.72E-06   | 9.08E-03   |
| Cobre (NC)                | 1.24E-04           | 1.24E-03            | 2.53E-06              | 9.20E-07 | 2.53E-05      | 9.20E-06 | 2.76E-05      | 1.31E-05               | 2.76E-04                    | 1.31E-04 | 4.90E-05   | 4.90E-04   |
| Hierro (NC)               | 2.60E-03           | 3.71E-03            | 1.77E-04              | 6.44E-05 | 2.53E-04      | 9.20E-05 | 8.36E-03      | 6.61E-03               | 1.19E-02                    | 9.44E-03 | 0.00E+00   | NA         |
| Plomo (NC)                | 6.36E-06           | 1.77E-03            | 1.52E-07              | 5.52E-09 | 4.21E-05      | 1.53E-06 | 2.12E-06      | 1.00E-07               | 5.88E-04                    | 2.79E-05 | 5.54E-06   | 1.54E-03   |
| Manganeso (NC)            | 4.88E-04           | 8.14E-03            | 1.64E-05              | 5.98E-06 | 2.74E-04      | 9.97E-05 | 1.48E-04      | 1.17E-04               | 2.47E-03                    | 1.95E-03 | 6.10E-04   | 1.02E-02   |
| Mercurio (NC)             | 6.36E-07           | 3.18E-05            | 1.01E-08              | 3.68E-09 | 5.05E-07      | 1.84E-07 | 3.40E-09      | 2.69E-09               | 1.70E-07                    | 1.35E-07 | 7.15E-07   | 7.15E-03   |
| Molibdeno (NC)            | 3.18E-06           | 6.36E-04            | 2.65E-06              | 9.66E-07 | 5.30E-04      | 1.93E-04 | 9.42E-07      | 7.45E-08               | 1.88E-04                    | 1.49E-05 | 4.19E-05   | 8.37E-03   |
| Níquel (C)                | 6.36E-06           | 5.30E-04            | 1.77E-07              | 1.29E-08 | 1.47E-05      | 1.07E-06 | 1.53E-06      | 2.42E-06               | 1.28E-04                    | 2.02E-04 | 1.86E-05   | 1.55E-03   |
| Selenio (NC)              | 6.36E-06           | 1.27E-03            | 2.53E-07              | 9.20E-08 | 5.05E-05      | 1.84E-05 | 1.94E-07      | 1.53E-08               | 3.87E-05                    | 3.06E-06 | 1.16E-05   | 2.32E-03   |
| Vanadio (NC)              | 1.89E-05           | 3.75E-03            | 5.05E-07              | 1.84E-07 | 1.00E-04      | 3.65E-05 | 2.16E-05      | 1.70E-05               | 4.28E-03                    | 3.38E-03 | 5.04E-06   | 1.00E-03   |
| Zinc (NC)                 | 2.23E-04           | 7.43E-04            | 1.64E-06              | 3.59E-07 | 5.47E-06      | 1.20E-06 | 1.60E-05      | 1.27E-05               | 5.35E-05                    | 4.23E-05 | 8.26E-04   | 2.75E-03   |

**Tabla 37    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 1.05E-02              | 1.94E-02           | NA                 | 1.15E-04           | 1.05E-02   | 1.94E-02   | NA         | 1.15E-04   | 8.92E-03   | 5.03E-03 | 1.06E-06   | 8.92E-03  | 5.03E-03 | 9.52E-04   | 4.70E-05   | 9.40E-03   | 6.50E-02 |
| Arsénico (C)              | 1.46E-05              | 2.70E-05           | NA                 | 1.45E-08           | 4.88E-02   | 9.01E-02   | NA         | 4.84E-05   | 1.43E-06   | 2.41E-07 | 1.70E-10   | 4.75E-03  | 8.05E-04 | NA         | 7.21E-07   | NA         | 1.96E-01 |
| Bario (NC)                | 6.76E-03              | 8.30E-03           | NA                 | 6.07E-08           | 3.38E-02   | 4.15E-02   | NA         | 3.03E-07   | 1.90E-05   | 1.07E-05 | 2.27E-09   | 9.51E-05  | 5.37E-05 | 2.03E-05   | 2.52E-06   | 5.04E-03   | 8.52E-02 |
| Cadmio (C)                | 5.01E-05              | 9.25E-05           | NA                 | 5.17E-09           | 5.01E-02   | 9.25E-02   | NA         | 5.17E-06   | 1.89E-07   | 1.07E-08 | 2.26E-11   | 1.89E-04  | 1.07E-05 | NA         | 2.26E-06   | NA         | 1.47E-01 |
| Cromo (C)                 | 1.60E-04              | 1.33E-02           | NA                 | 1.55E-06           | 5.34E-02   | 4.42E+00   | NA         | 5.18E-04   | 2.11E-05   | 1.19E-05 | 2.51E-09   | 7.03E-03  | 3.97E-03 | 1.12E-04   | 3.53E-07   | 3.53E-03   | 4.51E+00 |
| Cobalto (NC)              | 4.47E-05              | 9.85E-05           | NA                 | 8.24E-07           | 1.49E-01   | 3.28E-01   | NA         | 2.75E-03   | 3.83E-06   | 2.16E-07 | 4.57E-10   | 1.28E-02  | 7.22E-04 | 3.41E-04   | 1.01E-06   | 1.68E-01   | 7.06E-01 |
| Cobre (NC)                | 5.15E-02              | 1.99E-02           | NA                 | 6.16E-06           | 5.15E-01   | 1.99E-01   | NA         | 6.16E-05   | 7.71E-05   | 2.61E-05 | 9.20E-09   | 7.71E-04  | 2.61E-04 | 4.11E-05   | 1.96E-05   | 1.96E-02   | 7.37E-01 |
| Hierro (NC)               | 2.69E-02              | 4.96E-02           | NA                 | 8.04E-06           | 3.84E-02   | 7.08E-02   | NA         | 1.15E-05   | 1.52E-02   | 8.57E-03 | 1.81E-06   | 2.17E-02  | 1.22E-02 | NA         | 8.21E-05   | NA         | 5.94E-02 |
| Plomo (NC)                | 1.90E-05              | 2.32E-04           | NA                 | 1.89E-07           | 5.28E-03   | 6.44E-02   | NA         | 5.25E-05   | 8.51E-06   | 2.88E-07 | 1.02E-09   | 2.37E-03  | 8.01E-05 | NA         | 3.31E-06   | NA         | 7.62E-02 |
| Manganeso (NC)            | 1.53E-02              | 2.83E-02           | NA                 | 1.39E-05           | 2.56E-01   | 4.72E-01   | NA         | 2.31E-04   | 1.90E-04   | 1.08E-04 | 2.27E-08   | 3.17E-03  | 1.79E-03 | 2.03E-03   | 1.05E-06   | 2.10E-02   | 7.79E-01 |
| Mercurio (NC)             | 6.78E-06              | 1.88E-05           | NA                 | 1.12E-06           | 6.78E-02   | 1.88E-01   | NA         | 1.12E-02   | 4.58E-08   | 2.59E-08 | 5.47E-12   | 2.29E-06  | 1.29E-06 | 8.15E-08   | 2.28E-06   | 7.60E-03   | 2.82E-01 |
| Molibdeno (NC)            | 1.12E-04              | 2.06E-04           | NA                 | 4.02E-08           | 2.23E-02   | 4.12E-02   | NA         | 8.04E-06   | 1.15E-06   | 6.47E-08 | 1.37E-10   | 2.29E-04  | 1.29E-05 | 5.09E-08   | 3.29E-06   | 2.74E-04   | 7.41E-02 |
| Níquel (C)                | 1.41E-04              | 2.05E-03           | NA                 | 2.32E-07           | 1.17E-02   | 1.71E-01   | NA         | 1.93E-05   | 1.44E-06   | 1.63E-06 | 1.72E-10   | 1.20E-04  | 1.35E-04 | 4.27E-05   | 4.81E-06   | 2.67E-01   | 4.52E-01 |
| Selenio (NC)              | 2.58E-05              | 4.77E-05           | NA                 | 3.25E-07           | 5.17E-03   | 9.54E-03   | NA         | 6.50E-05   | 5.91E-07   | 3.34E-08 | 7.04E-11   | 1.18E-04  | 6.67E-06 | NA         | 2.09E-07   | NA         | 1.86E-02 |
| Vanadio (NC)              | 2.31E-04              | 4.26E-04           | NA                 | 7.15E-07           | 4.58E-02   | 8.46E-02   | NA         | 1.42E-04   | 4.59E-05   | 2.59E-05 | 5.48E-09   | 9.11E-03  | 5.14E-03 | NA         | 7.73E-07   | NA         | 1.57E-01 |
| Zinc (NC)                 | 1.00E-02              | 3.08E-02           | NA                 | 1.09E-04           | 3.34E-02   | 1.03E-01   | NA         | 3.63E-04   | 1.64E-05   | 9.24E-06 | 1.95E-09   | 5.46E-05  | 3.08E-05 | NA         | 3.08E-06   | NA         | 1.40E-01 |

**Tabla 37    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
|--------------------------|--------------------|-----------------------|-----------------------|----------|----------------|----------|---------------|------------------------|-------------------------------|----------|------------|--------------|
| Parámetro <sup>(a)</sup> | A. Agua para Beber |                       | B. Agua Superficial   |          |                |          | C. Sedimentos |                        |                               |          | D. Peces   |              |
|                          | Exposición         | ILCR -Agua para Beber | Exposición - AI Nadar |          | ILCR- AI Nadar |          | Exposición    | AI Caminar por el Agua | ILCR - AI Caminar por el Agua |          | Exposición | ILCR - Peces |
|                          | Ingestión          | Ingestión             | Ingestión             | Dérmica  | Ingestión      | Dérmica  | Ingestión     | Dérmica                | Ingestión                     | Dérmica  | Ingestión  | Ingestión    |
| <b>Metales</b>           |                    |                       |                       |          |                |          |               |                        |                               |          |            |              |
| Aluminio (NC)            | 8.73E-04           | 0.00E+00              | 7.07E-05              | 2.58E-05 | NA             | NA       | 1.30E-03      | 1.03E-03               | NA                            | NA       | 9.94E-04   | NA           |
| Arsénico (C)             | 2.55E-06           | 3.82E-06              | 2.42E-07              | 8.84E-08 | 3.64E-07       | 1.33E-07 | 2.73E-07      | 6.47E-08               | 4.09E-07                      | 9.71E-08 | 2.95E-06   | 4.42E-06     |
| Bario (NC)               | 2.01E-04           | 0.00E+00              | 5.05E-06              | 1.84E-06 | NA             | NA       | 7.58E-06      | 5.99E-06               | NA                            | NA       | 1.59E-04   | NA           |
| Cadmio (C)               | 5.09E-07           | NA                    | 1.11E-08              | 4.05E-09 | NA             | NA       | 1.62E-08      | 1.28E-09               | NA                            | NA       | 7.04E-07   | NA           |
| Cromo (C)                | 2.55E-06           | NA                    | 8.08E-08              | 2.95E-08 | NA             | NA       | 2.47E-06      | 1.95E-06               | NA                            | NA       | 1.30E-05   | NA           |
| Cobalto (NC)             | 2.55E-06           | NA                    | 2.02E-07              | 2.95E-08 | NA             | NA       | 1.34E-06      | 1.06E-07               | NA                            | NA       | 1.09E-06   | NA           |
| Cobre (NC)               | 4.97E-05           | NA                    | 1.01E-06              | 3.68E-07 | NA             | NA       | 1.10E-05      | 5.23E-06               | NA                            | NA       | 1.96E-05   | NA           |
| Hierro (NC)              | 1.04E-03           | NA                    | 7.07E-05              | 2.58E-05 | NA             | NA       | 3.35E-03      | 2.64E-03               | NA                            | NA       | NA         | NA           |
| Plomo (NC)               | 2.55E-06           | NA                    | 6.06E-08              | 2.21E-09 | NA             | NA       | 8.47E-07      | 4.02E-08               | NA                            | NA       | 2.22E-06   | NA           |
| Manganeso (NC)           | 1.95E-04           | NA                    | 6.57E-06              | 2.39E-06 | NA             | NA       | 5.92E-05      | 4.68E-05               | NA                            | NA       | 2.44E-04   | NA           |
| Mercurio (NC)            | 2.55E-07           | NA                    | 4.04E-09              | 1.47E-09 | NA             | NA       | 1.36E-09      | 1.08E-09               | NA                            | NA       | 2.86E-07   | NA           |
| Molibdeno (NC)           | 1.27E-06           | NA                    | 1.06E-06              | 3.87E-07 | NA             | NA       | 3.77E-07      | 2.98E-08               | NA                            | NA       | 1.67E-05   | NA           |
| Níquel (C)               | 2.55E-06           | NA                    | 7.07E-08              | 5.15E-09 | NA             | NA       | 6.13E-07      | 9.70E-07               | NA                            | NA       | 7.43E-06   | NA           |
| Selenio (NC)             | 2.55E-06           | 0.00E+00              | 1.01E-07              | 3.68E-08 | NA             | NA       | 7.74E-08      | 6.12E-09               | NA                            | NA       | 4.64E-06   | NA           |
| Vanadio (NC)             | 7.56E-06           | 0.00E+00              | 2.02E-07              | 7.36E-08 | NA             | NA       | 8.62E-06      | 6.82E-06               | NA                            | NA       | 2.02E-06   | NA           |
| Zinc (NC)                | 8.91E-05           | 0.00E+00              | 6.57E-07              | 1.44E-07 | NA             | NA       | 6.42E-06      | 5.07E-06               | NA                            | NA       | 3.31E-04   | NA           |

**Tabla 37    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Comunidades Agrícolas, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 4.20E-03              | 7.75E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 3.57E-03   | 2.01E-03 | 4.25E-07   | NA        | NA       | NA         | 1.88E-05   | NA         | NA         |
| Arsénico (C)             | 5.86E-06              | 1.08E-05           | NA                 | 5.80E-09           | 8.79E-06     | 1.62E-05     | NA           | 8.71E-09     | 5.70E-07   | 9.66E-08 | 6.80E-11   | 8.55E-07  | 1.45E-07 | 4.56E-10   | 2.89E-07   | 4.33E-07   | 3.57E-05   |
| Bario (NC)               | 2.70E-03              | 3.32E-03           | NA                 | NA                 | NA           | NA           | NA           | NA           | 7.61E-06   | 4.30E-06 | 9.08E-10   | NA        | NA       | NA         | 1.01E-06   | NA         | NA         |
| Cadmio (C)               | 2.00E-05              | 3.70E-05           | NA                 | 2.07E-09           | NA           | NA           | NA           | NA           | 7.57E-08   | 4.27E-09 | 9.03E-12   | NA        | NA       | 7.27E-11   | 9.04E-07   | 1.63E-06   | 1.63E-06   |
| Cromo (C)                | 6.41E-05              | 5.30E-03           | NA                 | 6.21E-07           | NA           | NA           | NA           | NA           | 8.43E-06   | 4.76E-06 | 1.01E-09   | NA        | NA       | 1.80E-07   | 1.41E-07   | 5.64E-06   | 5.82E-06   |
| Cobalto (NC)             | 1.79E-05              | 3.94E-05           | NA                 | 3.30E-07           | NA           | NA           | NA           | NA           | 1.53E-06   | 8.66E-08 | 1.83E-10   | NA        | NA       | NA         | 4.03E-07   | NA         | NA         |
| Cobre (NC)               | 2.06E-02              | 7.95E-03           | NA                 | 2.46E-06           | NA           | NA           | NA           | NA           | 3.08E-05   | 1.04E-05 | 3.68E-09   | NA        | NA       | NA         | 7.82E-06   | NA         | NA         |
| Hierro (NC)              | NA                    | NA                 | NA                 | NA                 | NA           | NA           | NA           | NA           | 6.07E-03   | 3.43E-03 | 7.24E-07   | NA        | NA       | NA         | 3.28E-05   | NA         | NA         |
| Plomo (NC)               | 7.61E-06              | 9.28E-05           | NA                 | 7.56E-08           | NA           | NA           | NA           | NA           | 3.41E-06   | 1.15E-07 | 4.06E-10   | NA        | NA       | NA         | 1.32E-06   | NA         | NA         |
| Manganeso (NC)           | 6.14E-03              | 1.13E-02           | NA                 | 5.55E-06           | NA           | NA           | NA           | NA           | 7.62E-05   | 4.30E-05 | 9.08E-09   | NA        | NA       | NA         | 4.19E-07   | NA         | NA         |
| Mercurio (NC)            | 2.71E-06              | 7.52E-06           | NA                 | 4.46E-07           | NA           | NA           | NA           | NA           | 1.83E-08   | 1.04E-08 | 2.19E-12   | NA        | NA       | NA         | 9.12E-07   | NA         | NA         |
| Molibdeno (NC)           | 4.47E-05              | 8.25E-05           | NA                 | 1.61E-08           | NA           | NA           | NA           | NA           | 4.58E-07   | 2.59E-08 | 5.46E-11   | NA        | NA       | NA         | 1.32E-06   | NA         | NA         |
| Níquel (C)               | 5.64E-05              | 8.19E-04           | NA                 | 9.26E-08           | NA           | NA           | NA           | NA           | 5.76E-07   | 6.50E-07 | 6.87E-11   | NA        | NA       | 1.17E-10   | 1.92E-06   | 7.31E-07   | 7.31E-07   |
| Selenio (NC)             | 1.03E-05              | 1.91E-05           | NA                 | NA                 | NA           | NA           | NA           | NA           | 2.36E-07   | 1.33E-08 | 2.82E-11   | NA        | NA       | NA         | 8.35E-08   | NA         | NA         |
| Vanadio (NC)             | 9.24E-05              | 1.70E-04           | NA                 | NA                 | NA           | NA           | NA           | NA           | 1.84E-05   | 1.04E-05 | 2.19E-09   | NA        | NA       | NA         | 3.09E-07   | NA         | NA         |
| Zinc (NC)                | 4.01E-03              | 1.23E-02           | NA                 | NA                 | NA           | NA           | NA           | NA           | 6.55E-06   | 3.70E-06 | 7.81E-10   | NA        | NA       | NA         | 1.23E-06   | NA         | NA         |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

         Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**Tabla 38 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

[illegible]

**Tabla 38    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Niños Pequeños, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
|---------------------------|-----------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|------------|----------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                    |                    |                    |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |            | IP Total |
|                           | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP         |          |
|                           | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |          |
| Metales                   |                       |                    |                    |                    |            |            |            |            |            |          |            |           |          |            |            |            |          |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.53E-01   | 8.75E-03 | 2.68E-06   | 1.53E-01  | 8.75E-03 | 9.50E-04   | 2.30E-04   | 4.60E-02   | 2.08E-01 |
| Arsénico (C)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.46E-05   | 4.22E-07 | 4.31E-10   | 8.19E-02  | 1.41E-03 | NA         | 4.57E-07   | NA         | 8.33E-02 |
| Bario (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.25E-04   | 1.87E-05 | 5.71E-09   | 1.63E-03  | 9.33E-05 | 2.03E-05   | 1.40E-06   | 2.80E-03   | 4.54E-03 |
| Cadmio (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.55E-06   | 1.46E-08 | 4.48E-11   | 2.55E-03  | 1.46E-05 | NA         | 1.16E-05   | NA         | 2.57E-03 |
| Cromo (C)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.61E-04   | 2.07E-05 | 6.33E-09   | 1.20E-01  | 6.89E-03 | 1.12E-04   | 3.47E-06   | 3.47E-02   | 1.62E-01 |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.55E-05   | 3.75E-07 | 1.15E-09   | 2.18E-01  | 1.25E-03 | 3.40E-04   | 5.20E-07   | 8.67E-02   | 3.07E-01 |
| Cobre (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.45E-03   | 5.00E-05 | 2.55E-08   | 1.62E-02  | 5.55E-04 | 4.53E-05   | 1.39E-03   | 1.39E+00   | 1.40E+00 |
| Hierro (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.60E-01   | 1.49E-02 | 4.56E-06   | 3.71E-01  | 2.13E-02 | NA         | 4.72E-04   | NA         | 3.92E-01 |
| Plomo (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.46E-04   | 5.02E-07 | 2.56E-09   | 4.06E-02  | 1.40E-04 | NA         | 3.46E-06   | NA         | 4.07E-02 |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.26E-03   | 1.87E-04 | 5.72E-08   | 5.43E-02  | 3.11E-03 | 2.03E-03   | 7.98E-06   | 1.60E-01   | 2.19E-01 |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 5.77E-07   | 3.31E-08 | 1.01E-11   | 2.89E-04  | 1.65E-05 | 5.99E-08   | 7.53E-07   | 2.51E-03   | 2.82E-03 |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.94E-05   | 1.11E-07 | 3.40E-10   | 3.88E-03  | 2.22E-05 | 5.03E-08   | 1.17E-06   | 9.76E-05   | 4.00E-03 |
| Níquel (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.45E-05   | 2.80E-06 | 4.29E-10   | 2.04E-03  | 2.34E-04 | 4.23E-05   | 1.48E-06   | 8.20E-02   | 8.43E-02 |
| Talio (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.06E-05   | 6.10E-08 | 1.87E-10   | 2.13E-03  | 1.22E-05 | NA         | 5.82E-07   | NA         | 2.14E-03 |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 7.87E-04   | 4.51E-05 | 1.38E-08   | 1.56E-01  | 8.95E-03 | NA         | 9.83E-06   | NA         | 1.65E-01 |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.79E-04   | 1.60E-05 | 4.89E-09   | 9.30E-04  | 5.33E-05 | NA         | 2.49E-06   | NA         | 9.83E-04 |

<sup>(a)</sup> Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas: Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).



**Tabla 39 Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central**

[illegible]

**Tabla 39    Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación no Cancerígena |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |                 |                 |
|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------|------------|------------|------------|------------|----------|------------|-----------|----------|------------|------------|-----------------|-----------------|
| Parámetro <sup>(a)</sup>  | E. Alimentos del País |                       |                       |                       |            |            |            |            | F. Suelo   |          |            |           |          |            | G. Aire    |                 | IP Total        |
|                           | Exposición<br>- Fruta | Exposición<br>- Arroz | Exposición<br>- Carne | Exposición<br>- Pollo | CP - Fruta | CP - Arroz | CP - Carne | CP - Pollo | Exposición |          |            | CP        |          |            | Exposición | CP              |                 |
|                           | Ingestión             | Ingestión             | Ingestión             | Ingestión             | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación      |                 |
| Metales                   |                       |                       |                       |                       |            |            |            |            |            |          |            |           |          |            |            |                 |                 |
| Aluminio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.90E-03   | 5.03E-03 | 1.06E-06   | 8.90E-03  | 5.03E-03 | 9.50E-04   | 2.30E-04   | 4.60E-02        | 6.09E-02        |
| Arsénico (C)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.43E-06   | 2.43E-07 | 1.71E-10   | 4.78E-03  | 8.09E-04 | NA         | 4.57E-07   | NA              | 5.59E-03        |
| Bario (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.90E-05   | 1.07E-05 | 2.26E-09   | 9.49E-05  | 5.36E-05 | 2.03E-05   | 1.40E-06   | 2.80E-03        | 2.97E-03        |
| Cadmio (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.49E-07   | 8.41E-09 | 1.78E-11   | 1.49E-04  | 8.41E-06 | NA         | 1.16E-05   | NA              | 1.57E-04        |
| Cromo (C)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 2.10E-05   | 1.19E-05 | 2.51E-09   | 7.01E-03  | 3.96E-03 | NA         | 3.47E-06   | 3.47E-02        | 1.10E-02        |
| Cobalto (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.82E-06   | 2.16E-07 | 4.56E-10   | 1.27E-02  | 7.19E-04 | 3.40E-04   | 5.20E-07   | 8.67E-02        | 1.00E-01        |
| Cobre (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.48E-05   | 2.87E-05 | 1.01E-08   | 8.48E-04  | 2.87E-04 | 4.53E-05   | 1.39E-03   | <b>1.39E+00</b> | <b>1.39E+00</b> |
| Hierro (NC)               | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | NA         | NA         | NA         | NA         | 1.52E-02   | 8.56E-03 | 1.81E-06   | 2.17E-02  | 1.22E-02 | NA         | 4.72E-04   | NA              | 3.39E-02        |
| Plomo (NC)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 8.52E-06   | 2.89E-07 | 1.02E-09   | 2.37E-03  | 8.02E-05 | NA         | 3.46E-06   | NA              | 2.45E-03        |
| Manganeso (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.90E-04   | 1.07E-04 | 2.27E-08   | 3.17E-03  | 1.79E-03 | 2.03E-03   | 7.98E-06   | 1.60E-01        | 1.67E-01        |
| Mercurio (NC)             | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 3.37E-08   | 1.90E-08 | 4.02E-12   | 1.68E-06  | 9.51E-07 | 5.99E-08   | 7.53E-07   | 2.51E-03        | 2.51E-03        |
| Molibdeno (NC)            | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.13E-06   | 6.39E-08 | 1.35E-10   | 2.26E-04  | 1.28E-05 | 5.03E-08   | 1.17E-06   | 9.76E-05        | 3.37E-04        |
| Níquel (C)                | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.43E-06   | 1.61E-06 | 1.70E-10   | 1.19E-04  | 1.34E-04 | 4.23E-05   | 1.48E-06   | 8.20E-02        | 8.23E-02        |
| Selenio (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 6.21E-07   | 3.51E-08 | 7.41E-11   | 1.24E-04  | 7.01E-06 | NA         | 5.82E-07   | NA              | 1.31E-04        |
| Vanadio (NC)              | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 4.59E-05   | 2.59E-05 | 5.48E-09   | 9.11E-03  | 5.15E-03 | NA         | 9.83E-06   | NA              | 1.43E-02        |
| Zinc (NC)                 | 0.00E+00              | 0.00E+00              | NA                    | 0.00E+00              | 0.00E+00   | 0.00E+00   | NA         | 0.00E+00   | 1.63E-05   | 9.19E-06 | 1.94E-09   | 5.42E-05  | 3.06E-05 | NA         | 2.49E-06   | NA              | 8.49E-05        |



**Tabla 39**    **Dosis de Exposición y Cocientes de Peligro/Valores de ILCR para Adultos, Línea de Cerco, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central (continuación)**

| Evaluación Cancerígena   |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
|--------------------------|-----------------------|--------------------|--------------------|--------------------|--------------|--------------|--------------|--------------|------------|----------|------------|-----------|----------|------------|------------|------------|------------|
| Parámetro <sup>(a)</sup> | E. Alimentos del País |                    |                    |                    |              |              |              |              | F. Suelo   |          |            |           |          |            | G. Aire    |            | ILCR Total |
|                          | Exposición - Fruta    | Exposición - Arroz | Exposición - Carne | Exposición - Pollo | ILCR - Fruta | ILCR - Arroz | ILCR - Carne | ILCR - Pollo | Exposición |          |            | ILCR      |          |            | Exposición | ILCR       |            |
|                          | Ingestión             | Ingestión          | Ingestión          | Ingestión          | Ingestión    | Ingestión    | Ingestión    | Ingestión    | Ingestión  | Dérmica  | Inhalación | Ingestión | Dérmica  | Inhalación | Inhalación | Inhalación |            |
| Metales                  |                       |                    |                    |                    |              |              |              |              |            |          |            |           |          |            |            |            |            |
| Aluminio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.56E-03   | 2.01E-03 | 4.25E-07   | NA        | NA       | NA         | 9.20E-05   | NA         | NA         |
| Arsénico (C)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | 0.00E+00     | 0.00E+00     | NA           | 0.00E+00     | 5.73E-07   | 9.71E-08 | 6.84E-11   | 8.60E-07  | 1.46E-07 | 4.59E-10   | 1.83E-07   | 2.74E-07   | 1.28E-06   |
| Bario (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 7.59E-06   | 4.29E-06 | 9.06E-10   | NA        | NA       | NA         | 5.61E-07   | NA         | NA         |
| Cadmio (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.96E-08   | 3.36E-09 | 7.10E-12   | NA        | NA       | 5.72E-11   | 4.63E-06   | 8.33E-06   | 8.33E-06   |
| Cromo (C)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 8.41E-06   | 4.75E-06 | 1.00E-09   | NA        | NA       | 1.80E-07   | 1.39E-06   | 5.55E-05   | 5.56E-05   |
| Cobalto (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.53E-06   | 8.63E-08 | 1.82E-10   | NA        | NA       | NA         | 2.08E-07   | NA         | NA         |
| Cobre (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.39E-05   | 1.15E-05 | 4.05E-09   | NA        | NA       | NA         | 5.55E-04   | NA         | NA         |
| Hierro (NC)              | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 6.06E-03   | 3.42E-03 | 7.23E-07   | NA        | NA       | NA         | 1.89E-04   | NA         | NA         |
| Plomo (NC)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 3.41E-06   | 1.16E-07 | 4.07E-10   | NA        | NA       | NA         | 1.39E-06   | NA         | NA         |
| Manganeso (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 7.60E-05   | 4.29E-05 | 9.06E-09   | NA        | NA       | NA         | 3.19E-06   | NA         | NA         |
| Mercurio (NC)            | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.35E-08   | 7.61E-09 | 1.61E-12   | NA        | NA       | NA         | 3.01E-07   | NA         | NA         |
| Molibdeno (NC)           | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 4.53E-07   | 2.56E-08 | 5.40E-11   | NA        | NA       | NA         | 4.69E-07   | NA         | NA         |
| Níquel (C)               | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 5.71E-07   | 6.44E-07 | 6.81E-11   | NA        | NA       | 1.16E-10   | 5.91E-07   | 2.24E-07   | 2.25E-07   |
| Selenio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 2.48E-07   | 1.40E-08 | 2.96E-11   | NA        | NA       | NA         | 2.33E-07   | NA         | NA         |
| Vanadio (NC)             | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 1.84E-05   | 1.04E-05 | 2.19E-09   | NA        | NA       | NA         | 3.93E-06   | NA         | NA         |
| Zinc (NC)                | 0.00E+00              | 0.00E+00           | NA                 | 0.00E+00           | NA           | NA           | NA           | NA           | 6.51E-06   | 3.67E-06 | 7.76E-10   | NA        | NA       | NA         | 9.96E-07   | NA         | NA         |

<sup>(a)</sup>    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

          Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

Tabla 40    Resumen de Cocientes de Peligro/Valores de ILCR, Proyecto Mina de Cobre Panamá, Caso de Impacto para Panamá - Estimación de la Exposición de Tendencia Central

| Parámetro      | Poblaciones Costeras |          |            | Poblaciones Indígenas |          |            | Poblaciones Agrícolas |          |            | Poblaciones en la Línea de Cerco |          |            |
|----------------|----------------------|----------|------------|-----------------------|----------|------------|-----------------------|----------|------------|----------------------------------|----------|------------|
|                | Niños Pequeños       | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños        | Adultos  |            | Niños Pequeños                   | Adultos  |            |
|                | IP Total             | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total              | IP Total | ILCR Total | IP Total                         | IP Total | ILCR Total |
| Metales        |                      |          |            |                       |          |            |                       |          |            |                                  |          |            |
| Aluminio (NC)  | 1.89E-01             | 3.34E-02 | NA         | 3.09E-01              | 6.60E-02 | NA         | 2.69E-01              | 6.50E-02 | NA         | 2.08E-01                         | 6.09E-02 | NA         |
| Arsénico (C)   | 3.47E-01             | 1.91E-01 | 3.41E-05   | 5.56E-01              | 2.79E-01 | 6.45E-05   | 3.32E-01              | 1.96E-01 | 3.57E-05   | 8.33E-02                         | 5.59E-03 | 1.28E-06   |
| Bario (NC)     | 4.68E-02             | 4.34E-02 | NA         | 1.06E-01              | 9.00E-02 | NA         | 9.04E-02              | 8.52E-02 | NA         | 4.54E-03                         | 2.97E-03 | NA         |
| Cadmio (C)     | 8.70E-02             | 8.17E-02 | 2.08E-07   | 1.35E-01              | 1.18E-01 | 1.45E-06   | 1.53E-01              | 1.47E-01 | 1.63E-06   | 2.57E-03                         | 1.57E-04 | 8.33E-06   |
| Cromo (C)      | 2.83E+00             | 2.71E+00 | 2.05E-06   | 5.15E+00              | 4.92E+00 | 3.85E-06   | 4.66E+00              | 4.51E+00 | 5.82E-06   | 1.62E-01                         | 1.10E-02 | 5.56E-05   |
| Cobalto (NC)   | 6.10E-01             | 3.43E-01 | NA         | 1.40E+00              | 8.01E-01 | NA         | 1.11E+00              | 7.06E-01 | NA         | 3.07E-01                         | 1.00E-01 | NA         |
| Cobre (NC)     | 4.89E-01             | 3.97E-01 | NA         | 9.69E-01              | 8.50E-01 | NA         | 8.36E-01              | 7.37E-01 | NA         | 1.40E+00                         | 1.39E+00 | NA         |
| Hierro (NC)    | 4.39E-01             | 3.54E-02 | NA         | 7.37E-01              | 8.37E-02 | NA         | 6.22E-01              | 5.94E-02 | NA         | 3.92E-01                         | 3.39E-02 | NA         |
| Plomo (NC)     | 8.81E-02             | 4.67E-02 | NA         | 1.47E-01              | 8.48E-02 | NA         | 1.25E-01              | 7.62E-02 | NA         | 4.07E-02                         | 2.45E-03 | NA         |
| Manganeso (NC) | 4.82E-01             | 4.16E-01 | NA         | 9.83E-01              | 8.11E-01 | NA         | 8.79E-01              | 7.79E-01 | NA         | 2.19E-01                         | 1.67E-01 | NA         |
| Mercurio (NC)  | 2.93E-01             | 2.92E-01 | NA         | 2.40E-01              | 2.01E-01 | NA         | 2.83E-01              | 2.82E-01 | NA         | 2.82E-03                         | 2.51E-03 | NA         |
| Molibdeno (NC) | 4.21E-02             | 3.63E-02 | NA         | 2.52E-01              | 1.26E-01 | NA         | 8.31E-02              | 7.41E-02 | NA         | 4.00E-03                         | 3.37E-04 | NA         |
| Níquel (C)     | 1.48E-01             | 1.44E-01 | 6.37E-08   | 4.61E-01              | 4.46E-01 | 6.72E-07   | 4.57E-01              | 4.52E-01 | 7.31E-07   | 8.43E-02                         | 8.23E-02 | 2.25E-07   |
| Selenio (NC)   | 2.73E-02             | 2.39E-02 | NA         | 4.40E-02              | 2.54E-02 | NA         | 2.15E-02              | 1.86E-02 | NA         | 2.14E-03                         | 1.31E-04 | NA         |
| Vanadio (NC)   | 2.73E-01             | 9.36E-02 | NA         | 4.34E-01              | 1.72E-01 | NA         | 3.83E-01              | 1.57E-01 | NA         | 1.65E-01                         | 1.43E-02 | NA         |
| Zinc (NC)      | 8.95E-02             | 8.79E-02 | NA         | 1.64E-01              | 1.49E-01 | NA         | 1.42E-01              | 1.40E-01 | NA         | 9.83E-04                         | 8.49E-05 | NA         |

(a)    Calificador químico - NC significa no cancerígeno; C significa cancerígeno; NA significa que no se ha evaluado porque la sustancia no era cancerígena o porque no se midió en un medio particular.

Notas:   Los valores en negrita y en cursiva indican que las estimaciones de riesgo exceden el cociente o índice de peligro objetivo (CP o IP > 1).

         Los valores resaltados y en negrita indican que la estimación de riesgo excede el valor ILRC (ILCR > 1E-5)

**ANEXO XIX**

**APÉNDICE K**

**Evaluación de la Calidad del Agua y Sedimentos**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

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## **1 DESCRIPCIÓN GENERAL**

Para efectos de este estudio, se procedió a evaluar los datos de la calidad del agua previstos comparándolos con los valores reglamentarios relevantes y aplicables, así como con la calidad del agua de línea base. Durante el proceso, los contaminantes de interés potencial (COPC por sus siglas en inglés) se identificaron como aquellas sustancias que excedían el valor reglamentario más bajo y que asimismo, mostraban un incremento del 10% o más sobre la concentración de línea base promedio en cualquiera de los lugares de muestreo. La comparación de los valores obtenidos con los valores reglamentarios se puede considerar como una evaluación conservadora de la posibilidad de que las concentraciones predichas tengan efectos adversos, mientras que, por otro lado, la comparación de los valores obtenidos con las concentraciones que pasaban el 10% de los valores de línea base se puede considerar como una evaluación conservadora de la posibilidad de que ocurra un impacto medible en la calidad del agua relacionado con el Proyecto. Dada la variabilidad temporal en la calidad del agua, la variabilidad de los métodos de muestreo y de los análisis de laboratorio, y la incertidumbre inherente existente en todo modelo de predicción de la calidad del agua, se consideró que todo aumento predicho que sea menor al 10% de los valores de línea base no representaba un cambio real en la calidad del agua que esté relacionado con el Proyecto.

Los elementos que se identificaron como COPC fueron el aluminio, el cadmio, el cobre y el molibdeno. Para determinar si era adecuado realizar ajustes en los criterios de los análisis específicos al área y evaluar el grado en que las concentraciones previstas indicaban un posible riesgo de efectos adversos en la vida acuática, se realizó un estudio de las bases de los criterios de análisis de estas sustancias (Sección 2.0). Luego se procedió a revisar el material bibliográfico científico relevante para evaluar con mayor detalle los COPC que, según la evaluación de análisis realizada, podían causar efectos adversos en la vida acuática (Sección 3.0). El objetivo de la revisión del material bibliográfico fue el de evaluar la incertidumbre inherente que se tiene al aplicar criterios de análisis norteamericanos (CCME 2008, USEPA 2007) para evaluar las concentraciones de COPC en las aguas superficiales panameñas. Finalmente, se dio ciertas recomendaciones para abordar la incertidumbre residual en la evaluación de la calidad del agua prevista (Sección 4.0).

## 2 EVALUACIÓN DE LOS CRITERIOS DE ANÁLISIS

La Tabla 2-1 presenta una evaluación de los criterios de análisis y de las concentraciones de COPC previstas. A continuación, se proporciona un resumen de los hallazgos de tal evaluación:

- **Aluminio** – El valor guía CCME (2008) para el aluminio depende del pH. Existen dos valores guía, los cuales se pueden aplicar a las aguas superficiales del área de estudio principal. El valor guía de 0.01 mg/L para aguas con un pH mayor a 6.5 se basa en un valor propuesto en un primer momento por la Agencia de Protección Ambiental de Estados Unidos (USEPA, por sus siglas en inglés, 1973), mientras que el valor guía de 0.005 mg/L para aguas con pH menores que 6.5 se basa en la concentración sin efecto para el sapo, *Bufo americanus* (Clark y LaZerte 1985).

Se previó que, durante la fase de cierre, la cuenca hidrográfica del Río Caimito podría presentar valores mayores a los valores guía CCME, y a las concentraciones de base en los nodos W3-2, W-3, W8 y W20 (ver desglose específico de las fases de la mina en la Tabla 2-1). Las concentraciones de aluminio previstas en estos cuatro nodos durante esta fase del Proyecto (0.3 mg/L en todos los casos), representan concentraciones mayores a los valores guía de la calidad del agua que pueden considerarse relativamente importantes. Sin embargo, el hecho de que las concentraciones de aluminio de línea base (0.2 mg/L) excedan el valor CCME por un factor de entre 20 y 40 sugiere que la biota que habita en estas aguas probablemente no es muy sensible al aluminio. Además, el incremento previsto en las concentraciones de aluminio durante la etapa de cierre (0.3 mg/L en comparación con 0.2 mg/L de la línea base) representa un cambio en el límite de precisión de las previsiones (es decir, a nivel de los décimos de un mg/L) y por lo tanto, probablemente se encuentra dentro de los límites de incertidumbre en el modelamiento de la calidad del agua. Tomando como base estas consideraciones, el riesgo potencial que representan las concentraciones de aluminio previstas se considera incierto, aunque probablemente bajo.

- **Cadmio** – El valor guía CCME (2008) para el cadmio (0.017 µg/L) se obtuvo multiplicando la concentración más baja de efectos observables (LOEC, por sus siglas en inglés) de 0.17 µg/L para el organismo más sensible (*Daphnia magna*; Biesinger y Christensen 1972) por un factor de seguridad de 0.1. Ninguno de los estudios utilizados para inferir el valor guía observó efectos en concentraciones menores a los 0.17 µg/L.

Tabla 2-1      Resumen de la Evaluación de los Criterios de Análisis Para los Contaminantes de Interés Potencial (COPC)

| COPC     | Criterio de Análisis                                                            | Bases de los Criterios                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Evaluación                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| aluminio | valor guía CCME para la protección de vida acuática en agua dulce               | El valor guía CCME para el aluminio se basa en el pH. El valor guía es de 0.005 mg/L para aguas con pH menor a 6.5, y 0.01 mg/L para aguas con pH igual o mayor que 6.5. Algunas concentraciones previstas fueron mayores a 0.1 mg/L y también excedieron los valores guía panameños (0.1 mg/L para las Clases 1-C y 2-C; 0.2 mg/L y la Clase 3-C).                                                                                                                                                                                                                                                                                                                                           | El valor guía CCME proviene del CCREM (Consejo Canadiense de Ministros de Recursos Naturales y Ambiente, por sus siglas en inglés, 1987). El valor guía de 0.01 mg/L para aguas con pH mayor que 6.5 se basa en un límite propuesto primero por la USEPA (1973), mientras que la guía de 0.005 mg/L se basa en la concentración sin efecto para el sapo, <i>Bufo americanus</i> (Clark y LaZerte 1985).<br>Las únicas excedencias de los valores guía CCME y de las concentraciones de línea base se presentan en cuatro nodos de la cuenca hidrográfica del Río Caimito:<br>- W3-2 (años de cierre 31-38 y 39-42, >43 [sólo máximo]);<br>- W3 (años de cierre 31-38 y 39-42, >43 máximo [sólo máximo]); y<br>- W8 (años de cierre 31-38 y 39-42, >43 [sólo máximo]).<br>- W20 (años de cierre 39-42 [sólo máximo])<br>Las concentraciones previstas en estos nodos (0.3 mg/L en todos los casos) representan incrementos relativamente pequeños comparados con la línea base (0.2 mg/L).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| cadmio   | valor guía CCME para la protección de vida acuática en agua dulce (provisional) | El valor guía CCME para el cadmio depende de la dureza del agua. La ecuación utilizada para pronosticar el valor guía de la calidad del agua es: $= 10^{(0.86 \times \log(\text{dureza}) - 3.2)}$ (en unidades de µg/L). El valor guía CCME (0.017 µg/L) asume una dureza de 48.5 mg/L. Este valor se puede ver incrementado en situaciones en la que se presente una mayor dureza en el agua.<br>El valor guía panameño más bajo para el cadmio es 1 µg/L, mientras que la concentración más alta prevista es de 0.2 µg/L.                                                                                                                                                                   | La guía CCME se obtuvo multiplicando una concentración más baja de efectos observables (LOEC) de 0.17 µg/L (Biesinger y Christensen 1972) para el organismo más sensible al cadmio, <i>Daphnia magna</i> , por un factor de seguridad de 0.1 (CCME 1991). A esta guía se le dio un estatus provisional ya que la concentración de cadmio en el agua no se verificó durante la exposición.<br>Si los CP (cocientes de peligro) se calculan sobre la base de las concentraciones de agua previstas empleando una LOEC de 0.17 µg/L, se puede considerar que todos los CP están por debajo de 1, excepto en tres nodos de la cuenca hidrográfica del Río Caimito:<br>- W3 (años de operaciones 0-27; años de cierre 28-30; 31-38; 39-42, >43 [sólo máximo]);<br>- W-3-2 (años de operaciones 0-27; años de cierre 28-30; 31-38; 39-42 >43 [sólo máximo]); y<br>- W8 (años de operaciones 0-27; años de cierre 28-30; 31-38; 39-42, >43 [sólo máximo]).<br>Las concentraciones más altas previstas en estos nodos (0.2 a 0.3 µg/L) se encuentran dentro de un factor de dos del LOEC para la especie más sensible (0.17 µg/L).                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| cobre    | valor guía CCME para la protección de vida acuática en agua dulce               | El valor guía CCME del cobre para la protección de la vida acuática depende de la dureza del agua. El valor guía es:<br>- 0.002 mg/L a una dureza de 0–120 mg/L de CaCO <sub>3</sub> (agua blanda a mediana);<br>- 0.003 mg/L a una dureza de 120–180 mg/L de CaCO <sub>3</sub> (agua dura); y<br>- 0.004 mg/L a una dureza >180 mg/L de CaCO <sub>3</sub> (agua muy dura).<br>El valor guía panameño más bajo es de 0.01 mg/L. El Criterio de Calidad de Agua Dulce para la Vida Acuática de la USEPA para el Cobre (USEPA 2007a,b) se basa en un Modelo del Ligando Biótico (BLM) y es de 0.0023 mg/L. Se calculó los criterios de calidad del agua específicos del área utilizando el BLM. | El valor guía CCME (2008) para el cobre en agua blanda (0.002 mg/L) se basa en un valor recomendado por Demayo y Taylor (1981), y se considera que no representa los últimos avances científicos en la toxicología del cobre. El Criterio de Calidad del Agua de la USEPA se basa en el Modelo del Ligando Biótico (BLM), un modelo de biodisponibilidad de metales que utiliza las características de las aguas receptoras para calcular los Criterios Continuos Crónicos (CCC) específicos del área.<br>Mediante el uso del BLM, se desarrollaron los siguientes Criterios Continuos Crónicos específicos para las cuencas hidrográficas:<br>- 0.00158 mg/L para la cuenca hidrográfica del Río Petaquilla;<br>- 0.00223 mg/L para la cuenca hidrográfica del Río San Juan; y<br>- 0.00432 mg/L para la cuenca hidrográfica del Río Caimito.<br>Estos valores CCC específicos para las cuencas hidrográficas son similares en magnitud a los valores guía para el cobre total adoptados por la CCME. La diferencia es que los valores CCC tienen el propósito de proporcionar una base para la evaluación de las concentraciones de cobre disuelto, que se espera sean menores a las concentraciones de cobre total. La comparación de las concentraciones de cobre total con los valores CCC representa, por lo tanto, una evaluación conservadora de la posibilidad de que ocurran efectos adversos en la vida acuática. El grado de conservadurismo inherente en esta comparación depende de la fracción de cobre total que se encuentra en la fase disuelta. |

Tabla 2-1      Resumen de la Evaluación de los Criterios de Análisis Para los Contaminantes de Interés Potencial (COPC) (continuación)

| COPC      | Criterio de Análisis                        | Bases de los Criterios                                                                                                                                                                                                                                                                                                                                                                                   | Evaluación                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                             |                                                                                                                                                                                                                                                                                                                                                                                                          | <p>Aunque las concentraciones de cobre total previstas exceden los CCC específicos de las cuencas hidrográficas en diversos nodos de las cuencas hidrográficas de los ríos Petaquilla y San Juan/Botija, tales concentraciones no exceden los valores de línea base en estas ubicaciones. En la cuenca hidrográfica del Río Caimito, los valores que exceden tanto el CCC como de las concentraciones de línea base se presentan en:</p> <ul style="list-style-type: none"><li>- W3 (años de operaciones 0-27, 28-30; años de cierre 31-38, 39-42, y &gt;43). Las concentraciones previstas promedio son de 0.01 mg/L, mientras que los valores máximos son de 0.02 mg/L. Las concentraciones máximas (0.02 mg/L) son más altas en los años de cierre 31-38, 39-42, &gt;43. La concentración de la calidad del agua de línea base en esta ubicación es de 0.003 mg/L.</li><li>- W3-2 (años de operaciones 0-27, 28-30; años de cierre 31-38, 39-42, y &gt;43). Las concentraciones previstas promedio son de 0.01 mg/L, mientras que los valores máximos son de 0.02 mg/L. Las concentraciones máximas (0.02 mg/L) son más altas en los años de cierre 31-38, 39-42, &gt;43. La concentración de la calidad del agua de línea base en esta ubicación es de 0.003 mg/L.</li><li>- W8 (años de operaciones 0-27, 28-30; años de cierre 31-38, 39-42, y &gt;43). Las concentraciones previstas promedio son entre 0.004 mg/L (cierre &gt;43) y 0.01 mg/L (años de cierre 31-38 y 39-42), mientras que los valores máximos son de 0.01 mg/L a lo largo de toda la vida de la mina (operaciones y cierre/post-cierre). La concentración de la calidad del agua de línea base en esta ubicación es de 0.003 mg/L.</li><li>- W13 (años de operaciones 0-27, 28-30; años de cierre 31-38, 39-42, y &gt;43). Las concentraciones previstas promedio son entre 0.004 mg/L (años de operaciones 0-27) y 0.006 mg/L (años de cierre 31-38), mientras que los valores máximos variaron entre 0.005 (años de operaciones 0-27 y años de cierre &gt;43) y 0.006 mg/L (años de operaciones 28-30; años de cierre 31-38 y 39-42). La concentración de la calidad del agua de línea base en esta ubicación es de 0.003 mg/L.</li><li>- W20 (años de operaciones 0-27, 28-30; años de cierre 31-38, 39-42 y &gt;43). Las concentraciones previstas promedio son entre 0.005 mg/L (años de operaciones 0-27 y 28-30) y 0.006 mg/L (años de cierre 31-38), mientras que los valores máximos variaron entre 0.005 (años de operaciones 0-27) y 0.006 mg/L (años de operaciones 28-30; años de cierre 31-38, 39-42 y &gt;43). La concentración de la calidad del agua de línea base en esta ubicación es de 0.003 mg/L.</li></ul> <p>Las concentraciones de cobre previstas tienden a ser más altas durante las fases de cierre y post-cierre que durante la fase de operación de la mina.</p> |
| molibdeno | valor guía CCME para uso agrícola (regadío) | El valor guía CCME más bajo se basa en el uso agrícola (riego: de 0.01 a 0.05 mg/L). El límite superior (0.05 mg/L) de los criterios agrícolas es para uso a corto plazo sólo en suelos ácidos. La concentración de agua prevista más alta para el molibdeno es de 0.02 mg/L. La guía CCME para agua para el ganado es de 0.5 mg/L y para la protección de vida acuática de agua dulce es de 0.073 mg/L. | El valor guía CCME para uso agrícola se basa en el riesgo asociado con la recolección de cultivos de los suelos para el ganado que consume alimento contaminado, más que para los cultivos mismos. Las plantas toleran niveles de tejido de molibdeno de varios cientos de mg/kg sin efectos adversos (Gupta y Lipsett 1981). La concentración de molibdeno más alta pronosticada en el agua (0.02 mg/L) dentro del área de estudio se encuentra por debajo del valor guía CCME para la vida acuática en agua dulce (0.073 mg/L), por lo que se prevé que las concentraciones previstas tendrán un impacto insignificante en la vida acuática de agua dulce.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

La concentración de línea base promedio del cadmio en el área de estudio principal fue de 0.1 µg/L. Las concentraciones previstas de calidad del agua también fueron evaluadas contra el valor LOEC más sensible de 0.17 µg/L. Las concentraciones de cadmio previstas excedieron 0.17 µg/L sólo durante las fases de operaciones y cierre en tres nodos en la cuenca hidrográfica del Río Caimito (W-3, W-3-2 y W8), con concentraciones previstas que fluctuaban entre 0.2 y 0.3 µg/L (Tabla 2-1). Estas concentraciones previstas son menores al doble de la LOEC para la especie más sensible utilizada en el desarrollo de los valores guía, y por lo tanto, las concentraciones de cadmio previstas representan un riesgo de efectos adversos relativamente bajo.

- **Cobre** – El valor guía CCME (2008) para el cobre en agua blanda (0.002 mg/L) se basa en un valor recomendado por Demayo y Taylor (1981), y no se considera que represente los últimos avances científicos relacionados con la toxicología del cobre. Se ha incorporado avances científicos más recientes en el Criterio de Calidad de Agua de la USEPA (0.0023 mg/L), valor que se basa en la aplicación del Modelo del Ligando Biótico (BLM, por sus siglas en inglés) (USEPA 2007). El BLM es un modelo de biodisponibilidad de metales que utiliza las características de las aguas receptoras para calcular Criterios Continuos Crónicos (CCC) específicos del área. Con el empleo del BLM, se desarrolló los siguientes valores CCC para el cobre disuelto: 0.0016 mg/L para la cuenca hidrográfica del Río Petaquilla, 0.0022 mg/L para la cuenca hidrográfica del Río San Juan, y 0.0043 mg/L para la cuenca hidrográfica del Río Caimito. Estos valores específicos para las cuencas hidrográficas son similares en magnitud a los valores guía para el cobre total adoptados por la CCME, pero, al considerar los valores CCC, se puede obtener una base para la evaluación de las concentraciones de cobre disuelto, que se espera sean menores a las concentraciones de cobre total. La comparación de las concentraciones de cobre total con los valores CCC representa, por lo tanto, una evaluación conservadora de la posibilidad de que haya efectos adversos en la vida acuática. El grado de conservadurismo inherente en esta comparación depende de la fracción de cobre total que se encuentre en la fase disuelta.

Las concentraciones de cobre total previstas excedieron los valores CCC en varios nodos en las cuencas hidrográficas de los ríos Petaquilla y San Juan/Botija, aunque no excedieron las concentraciones de línea base en estas ubicaciones. En la cuenca hidrográfica del Río Caimito, las concentraciones de cobre total previstas excedieron tanto los valores CCC como las concentraciones de línea base en los nodos W3, W3-2, W8, W7, W13 y W20 durante las fases de operaciones y cierre (Tabla 2-1). Las concentraciones de cobre total previstas en estos nodos en la cuenca hidrográfica del Río Caimito (concentraciones promedio de hasta 0.01 mg/L, concentraciones máximas de hasta 0.02 mg/L) representan excedencias relativamente importantes de los valores CCC (de 0.0016 a 0.0043 mg/L) y de las concentraciones de línea base (0.003 mg/L). Cabe resaltar que la comparación de las concentraciones de cobre previstas (cobre total) con los valores CCC (cobre disuelto) que se hace en esta evaluación se considera bastante conservadora. El riesgo potencial que representan las concentraciones previstas de cobre es incierto. Esta incertidumbre no se puede resolver en este momento, puesto que la fracción total de cobre prevista que podrá estar presente en la fase disuelta se desconoce.

- **Molibdeno** – El criterio reglamentario más bajo fue el valor guía CCME (2008) para uso agrícola, el cual se basa en el riesgo asociado con la recolección de cultivos de los suelos destinados para el ganado que consume alimento contaminado, más que para los cultivos mismos. Las plantas toleran niveles de tejido de molibdeno de varios cientos de mg/kg sin llegar a tener efectos adversos (Gupta y Lipsett 1981). La concentración más alta de agua pronosticada (0.02 mg/L) en el área del Proyecto se encuentra por debajo del valor guía para la vida acuática en agua dulce (0.073 mg/L), por lo que se prevé que las concentraciones de molibdeno previstas tendrán impactos insignificantes en la vida acuática de agua dulce.

### **3 REVISIÓN DEL MATERIAL BIBLIOGRÁFICO CIENTÍFICO RELEVANTE**

Para evaluar con mayor detalle la incertidumbre inherente de la aplicación de los criterios de análisis norteamericanos en la evaluación de las concentraciones de aluminio y cobre en las aguas superficiales panameñas, se revisó el material bibliográfico científico relevante. El Consejo Canadiense de Ministros del Ambiente (CCME 2008) y la Agencia de Protección Ambiental de Estados Unidos (USEPA 1988, 2007) han desarrollado valores guía de calidad del agua para el aluminio y el cobre, con miras a proteger la vida acuática. Estas guías se elaboraron para proteger las especies norteamericanas más sensibles y, por lo tanto, no es raro utilizarlas para evaluar ambientes de aguas frías y aguas cálidas. Por ejemplo, el Departamento de Protección Ambiental de la Florida indicó que los estándares de calidad del agua de Florida se basan en los criterios de la USEPA, y observó que los datos utilizados para obtener los criterios de calidad del agua incluyen cierto número de peces de aguas cálidas encontrados en este estado (N. Roth, comunicación personal, Departamento de Protección Ambiental de Florida, 10 de febrero de 2010).

A pesar de la práctica habitual de aplicar criterios de análisis norteamericanos a los ambientes tropicales, existen ciertas diferencias entre los sistemas templados y tropicales que podrían causar incertidumbre al momento de elaborar las conclusiones relevantes de las evaluaciones realizadas. Los aspectos principales incluyen la comparabilidad de la sensibilidad de las especies a los diferentes climas, los efectos de las diversas características del agua en la toxicidad del metal y la diferencias existentes en los niveles naturales de línea base de los metales que podrían producir diferentes formaciones de especies y/o diferentes sensibilidades en las mismas.

Existen pocos estudios que han comparado las sensibilidades existentes entre las biotas templadas y las tropicales. Dyer et al. (1997) llevó a cabo una evaluación de estudios de toxicidad aguda en algunos químicos, descubriendo que las especies de peces de agua fría eran las más sensibles, seguidas por las especies templadas y finalmente las tropicales. La evaluación utilizó datos de toxicidad aguda, pero no se sabe si la sensibilidad a la exposición crónica tenía un patrón similar. No obstante, los resultados de esta evaluación sugieren que el usar las guías obtenidas de especies de agua fría o templada puede ofrecer una evaluación conservadora de la posibilidad de la existencia de efectos adversos en las especies tropicales.

Los efectos de las características del agua en la toxicidad del aluminio y el cobre son bastante conocidos. Se ha informado que la toxicidad del aluminio y el cobre varían considerablemente según la alcalinidad, dureza, pH, materia orgánica disuelta y temperatura (Gensemer y Playle 1999) del agua. Así, es posible que estas características puedan influenciar la posibilidad de que haya efectos adversos

causados por el aluminio y el cobre en el área de estudio principal, ya que los arroyos en esta zona tienden a ser cálidos, claros (es decir, con un contenido bajo de carbono orgánico disuelto) y circumneutros, pero con una capacidad de amortiguamiento baja (es decir, pobres en iones y probablemente susceptibles a los cambios que pudieran existir en el pH).

Existe una relación entre la temperatura del agua y la toxicidad: mientras mayor sea la temperatura, mayor será la toxicidad para algunas especies (pero no todas; Carvalho y Fernandes 2006), aunque, por lo general, este incremento en la toxicidad está relacionado al metabolismo de las especies, es decir, si la especie tiene un mayor metabolismo, entonces, tendrá una mayor absorción y distribución de tóxicos (Dyer et al. 1997). Este mismo autor observó que, con frecuencia, las conclusiones a las que se llega respecto a la toxicidad relacionada con la temperatura no consideran el ambiente térmico del hábitat de una especie. Por lo tanto, se anticipa que la posibilidad de un aumento en la toxicidad del aluminio y el cobre debido solamente a la temperatura del agua sería baja.

Por otro lado, los estudios realizados confirmaron los efectos del pH en la toxicidad del aluminio y el cobre, los cuales se obtienen tomando como base los valores guía de la calidad del agua de CCME (CCME 1998) y los criterios de la calidad del agua de USEPA (USEPA 2007). La mayoría de los estudios han relacionado la toxicidad del aluminio con condiciones ácidas, ya que el aluminio se vuelve más tóxico para la biota acuática en agua ácida (Gensemer y Playle 1999). Algunos de estos estudios incluyeron especies tropicales. Un estudio sobre el pez neotropical de agua dulce *Prochilus lineatus* en particular descubrió que, para alterar la capacidad osmorreguladora de la especie (Camargo et al. 2009) era necesario que se viera agudamente expuesta a concentraciones de aluminio disuelto de 196 µg/L (valores que son considerablemente mayores a los valores de análisis de CCME y USEPA). No obstante, no se cuenta con estudios que traten acerca de exposición crónica, por lo que no está muy claro cuáles serían las concentraciones que podrían causar efectos crónicos.

También se cuenta con una considerable cantidad de información respecto a los efectos del carbono orgánico disuelto (COD) en la toxicidad del aluminio y el cobre. La concentración del COD tiene una fuerte influencia en el criterio calculado por el BLM (USEPA 2007), debido a la capacidad que tiene el COD de aglutinar cobre disuelto y evitar que provoque efectos tóxicos. Algunos investigadores han sugerido efectos similares del COD en la toxicidad del aluminio, como por ejemplo Roy et al. (2000), quien identificó niveles de base de aluminio total en el Río Saguenay, Canadá, que excedieron los valores guía de la CCME (100 µg/L) y el USEPA (87 µg/L) para el pH circumneutral. En el estudio, se midió los niveles de toxicidad en la especie *Ceriodaphnia dubia* y en las larvas de carpitas cabezonas (*Pimephales promelas*) que habitaban en el ambiente receptor, el cual recibía descargas de una planta reductora



de aluminio primario. A pesar de que los niveles de aluminio mostraron concentraciones de hasta 596 µg/L en el agua receptora, no hubo efectos considerables en la reproducción de la *C. dubia*, ni tampoco en el crecimiento de las carpitas cabezonas o en la supervivencia de ninguno de los dos organismos (Roy et al. 2000). Es necesario recalcar que, en este río, una buena parte del aluminio estaba dirigida a la materia orgánica, con la intención de reducir los impactos de la toxicidad del aluminio (Winter et al. 2005). Finalmente, Roy et al. (2000) sostuvieron que las evaluaciones basadas en el aluminio total sobreestimarían el riesgo que pudiera causar este elemento al medio ambiente, por lo que sugirieron que se exprese un valor guía más apropiado como aluminio inorgánico monomérico, que es la forma asociada a la toxicidad en organismos acuáticos.

En general, las aguas superficiales del área de estudio principal son bajas en COD, lo cual indica que tienen una capacidad limitada para aglutinar cobre disuelto y aluminio. La dureza y la alcalinidad también tienden a ser bajas en esta zona, aunque el pH tiende a ser circumneutral. En general, el pH circumneutral está asociado con la baja toxicidad del aluminio y el cobre, aunque la baja capacidad de amortiguamiento de estas aguas también podría indicar una posible susceptibilidad a la acidificación. Por lo tanto, si se produjera un cambio en las condiciones ácidas del agua, podría haber un aumento en la toxicidad del aluminio y el cobre.

## 4 CONCLUSIONES Y RECOMENDACIONES

El presente estudio identificó el aluminio y el cobre como dos sustancias cuyas posibles concentraciones en el agua de ciertas ubicaciones podrían representar un riesgo de efectos adversos en la vida acuática. No obstante, la posibilidad de que las concentraciones previstas afecten la vida acuática aún es incierta, por las siguientes razones:

- Las concentraciones de línea base del aluminio y el cobre en el área de estudio principal fueron mayores a los valores del análisis reglamentario. Esto sugiere dos situaciones: que cualquier nivel natural de estas sustancias en la región es tóxico en la vida acuática; o que la excedencia de los valores resultantes del análisis en realidad no indica que haya la posibilidad de causar efectos adversos. Tomando como base el material bibliográfico revisado, se puede considerar que la última explicación es la más probable. Los valores del análisis probablemente no reflejen con precisión la sensibilidad que pueda tener la biota panameña de agua dulce al aluminio y cobre.
- El aumento previsto en la concentración de aluminio en el agua es bajo en relación con la precisión con la que se modelan estos pronósticos y, por lo tanto, no se sabe con certeza si en realidad ocurrirá un aumento que se pueda medir.
- La evaluación del cobre se basó conservadoramente en una comparación de cobre total (la base de las concentraciones previstas) con cobre disuelto (la base del Criterio Crónico Continuo). En este momento, no es posible pronosticar cuál será la fracción del cobre que estará en forma disuelta y, por lo tanto, no se sabe con certeza si el cobre total previsto representa un riesgo de efectos adversos.

Dadas las consideraciones descritas anteriormente, se concluye que las concentraciones previstas de COPC en el agua indican una *posibilidad* de efectos adversos, pero que la *probabilidad* de efectos adversos es muy incierta. Lamentablemente, en la actualidad no existen datos o conocimiento científico suficiente para resolver esta incertidumbre del todo. Por lo tanto, se recomienda que MPSA se comprometa a desarrollar un Plan de Gestión de Calidad del Agua que pueda implementarse durante las fases de desarrollo y operación de la mina, hasta un grado tal que evite impactos inaceptables en la vida acuática. En general, las mayores concentraciones previstas de COPC en el agua no ocurren hasta después del cierre de la mina, lo cual indica que habrá un período de oportunidad para perfeccionar la evaluación de efectos potenciales e implementar el plan de mitigación, según sea necesario.

Al tener un Plan de Manejo de Calidad del Agua para el Proyecto, se podría definir un programa de monitoreo y una serie de reglas de decisión que podrían especificar las

acciones a tomar según los resultados obtenidos en las actividades de monitoreo. Los componentes de un Plan de Manejo de Calidad del Agua podrían incluir:

- un programa de monitoreo diseñado para detectar cualquier cambio relacionado con el Proyecto en la calidad del agua;
- el desarrollo de una o más concentraciones de referencia asociadas con los efectos adversos potenciales;
- investigaciones confirmatorias de la calidad del agua, a ejecutarse en caso que el monitoreo indique una desviación de las condiciones de la calidad del agua de línea base;
- investigaciones de tendencias, para evaluar si las desviaciones de las condiciones de línea base indican un potencial de excedencia de las referencias de efectos; y
- una secuencia (por niveles) de las acciones de gestión a seguir, las cuales deberán ejecutarse sólo de ser necesario, para evitar impactos inaceptables en la vida acuática.

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**ANEXO XIX**

**APÉNDICE L**

**Modelo de la Cadena Alimenticia**

**Enviado a:**

**Minera Panamá S.A**

**Setiembre 2010**

**07-1334-0018**

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Modelo de Cadena Alimenticia para la Línea Base

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1 ESTIMADO DE TENDENCIAS CENTRALES PARA EL ESCENARIO DE LÍNEA BASE

Tabla 1      Página de Resumen

|                     |                                                       |               |     |  |           |                                           |                                                                                     |  |
|---------------------|-------------------------------------------------------|---------------|-----|--|-----------|-------------------------------------------|-------------------------------------------------------------------------------------|--|
| Nombre del proyecto | Mina de Cobre Panamá                                  |               |     |  | Archivos: | (1) Página de resumen                     |  |  |
| Número de proyecto  | 07-1334-0018                                          | Creado por:   | LSC |  |           | (2) Concentraciones ambientales           |                                                                                     |  |
| Fecha:              | 10 de junio de 2010                                   | Revisado por: | ADB |  |           | (3) Modelos de absorción                  |                                                                                     |  |
| Notas:              | Caso de línea base - Estimado de tendencias centrales |               |     |  |           | (4) Valores de referencia de toxicidad    |                                                                                     |  |
|                     |                                                       |               |     |  |           | (5) Cálculos del rango de hábitat         |                                                                                     |  |
|                     |                                                       |               |     |  |           | (6) Páginas de cálculo para cada receptor |                                                                                     |  |

|                        | Aluminio | Antimonio | Arsénico | Bario   | Cadmio  | Cromo | Cobalto | Cobre | Plomo   | Molibdeno | Selenio | Estroncio | Vanadio |
|------------------------|----------|-----------|----------|---------|---------|-------|---------|-------|---------|-----------|---------|-----------|---------|
| jaguar                 | 0.11     | 3.9E-03   | 8.7E-04  | 0.00    | 6.1E-04 | 0.00  | 1.1E-04 | 0.01  | 1.8E-03 | 1.2E-03   | 0.02    | 2.8E-04   | 9.0E-04 |
| tapir                  | 105.68   | 0.32      | 0.01     | 0.03    | 3.2E-03 | 0.14  | 2.6E-03 | 1.05  | 0.01    | 0.05      | 0.19    | 0.02      | 0.03    |
| mono araña             | 118.86   | 0.31      | 3.6E-03  | 0.08    | 4.0E-03 | 0.15  | 1.4E-03 | 0.93  | 3.3E-03 | 0.14      | 0.10    | 0.02      | 0.01    |
| águila crestada        | 7.1E-03  | NA        | 1.4E-04  | 4.7E-04 | 1.5E-03 | 0.02  | 4.9E-04 | 0.04  | 0.03    | 8.0E-06   | 0.03    | 5.7E-06   | 0.06    |
| martín pescador grande | 12.01    | NA        | 0.11     | 0.19    | 0.02    | 0.25  | 0.01    | 0.24  | 0.08    | 0.02      | 0.71    | 0.08      | 0.30    |
| armadillo              | 821.18   | 9.92      | 0.14     | 0.12    | 0.13    | 1.06  | 0.11    | 1.30  | 2.75    | 0.33      | 2.92    | 0.01      | 1.40    |
| loro cabeciazul        | 143.63   | NA        | 0.02     | 0.40    | 0.01    | 0.44  | 0.02    | 1.88  | 0.18    | 0.03      | 0.08    | 0.03      | 4.33    |
| zorzalito de swainson  | 1269.58  | NA        | 0.19     | 1.09    | 0.25    | 2.94  | 0.37    | 5.30  | 30.57   | 0.06      | 5.45    | 0.04      | 52.61   |

Tabla 2      Concentraciones Ambientales

|                               |                      | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  | Porcentaje De Humedad |
|-------------------------------|----------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|-----------------------|
| Ítem                          | Unidades             |          |           |          |          |          |          |          |          |          |           |          |           |          |                       |
| suelo                         | mg/kg de peso seco   | 3.15E+04 | 1.00E+01  | 5.00E+00 | 6.71E+01 | 5.00E-01 | 7.42E+01 | 1.35E+01 | 2.41E+02 | 3.00E+01 | 4.00E+00  | 2.00E+00 | 6.25E+00  | 1.62E+02 |                       |
| agua                          | mg/L                 | 4.38E-01 | 2.00E-04  | 2.00E-04 | 1.65E-02 | 1.10E-04 | 7.50E-04 | 1.00E-03 | 5.61E-03 | 4.00E-04 | 5.00E-04  | 3.50E-04 | 3.52E-02  | 1.43E-03 |                       |
| gusanos                       | mg/kg de peso húmedo | 6.32E+03 | 2.40E+00  | 4.82E-01 | 2.75E+01 | 4.46E-01 | 9.20E+00 | 3.42E+00 | 2.51E+01 | 6.08E+01 | 2.53E-01  | 1.92E+00 | 1.40E+01  | 2.13E+01 | 0.76                  |
| hojas                         | mg/kg de peso húmedo | 2.23E+03 | 1.55E-01  | 6.20E-02 | 1.78E+01 | 2.64E-02 | 3.43E+00 | 1.30E-01 | 6.95E+01 | 1.16E-01 | 1.15E-01  | 3.10E-01 | 6.12E+01  | 2.76E-01 | 0.69                  |
| fruta                         | mg/kg de peso húmedo | 8.54E+02 | 7.20E-02  | 7.20E-03 | 2.09E+01 | 1.25E-02 | 1.33E+00 | 2.91E-02 | 1.47E+01 | 6.48E-02 | 1.95E-01  | 1.20E-02 | 2.23E+01  | 1.17E-01 | 0.76                  |
| peces                         | mg/kg de peso húmedo | 9.87E+01 | 1.00E-02  | 4.88E-01 | 7.90E+00 | 6.99E-02 | 1.30E+00 | 9.27E-02 | 1.95E+00 | 2.45E-01 | 1.60E-01  | 4.09E-01 | 4.10E+01  | 2.00E-01 | 0.75                  |
| mamíferos herbívoros grandes  | mg/kg de peso húmedo | 3.06E-01 | 1.88E-05  | 1.62E-05 | 2.27E-04 | 1.37E-06 | 1.81E-03 | 3.76E-04 | 5.90E-02 | 8.22E-06 | 7.18E-05  | 4.04E-04 | 1.52E-03  | 2.97E-04 | 0.68                  |
| mamíferos herbívoros pequeños | mg/kg de peso húmedo | 3.44E-01 | 1.80E-05  | 7.41E-06 | 6.19E-04 | 1.71E-06 | 1.95E-03 | 2.02E-04 | 5.21E-02 | 4.58E-06 | 2.18E-04  | 2.18E-04 | 1.83E-03  | 7.57E-05 | 0.68                  |
| mamíferos pequeños            | mg/kg de peso húmedo |          | 3.84E-02  | 9.38E-03 | 2.75E-01 | 6.56E-02 | 1.75E+00 | 1.10E-01 | 5.44E+00 | 1.55E+00 |           | 2.74E-01 |           | 6.38E-01 | 0.68                  |

Nota:    La concentración en mamíferos herbívoros grandes se calcula a partir de la dosis diaria final del tapir \* BTF (ORNL, 1984)  
          La concentración en mamíferos herbívoros pequeños se calcula a partir de la dosis diaria final del mono araña \* BTF (ORNL, 1984)

Tabla 3 Tipo De Modelos De Absorción

|       |   |                               | Aluminio     | Antimonio    | Arsénico     | Bario        | Cadmio       | Cromo        | Cobalto      | Cobre        | Plomo        | Molibdeno    | Selenio      | Estroncio    | Vanadio      |
|-------|---|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Medio | a | Ítem                          |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Suelo | a | gusanos                       | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | hojas                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | fruta                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | peces                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | mamíferos herbívoros grandes  | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos herbívoros pequeños | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos pequeños            |              | BAF-ECO      | LR-ECO       | BAF-ECO      | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       |              | LR-ECO       |              | BAF-ECO      |

**LEYENDA:**

**BTF-ORNL**

Factor de transferencia de la carne de vacuno a partir de los informes del Oak Ridge National Laboratory

**LR-ORNL**

Regresión lineal a partir de los informes del Oak Ridge National Laboratory

**BAF-ORNL**

Factor de bioacumulación a partir de los informes del Oak Ridge National Laboratory

**BAF-ECO**

Factor de bioacumulación de ECO-SSL

**Pronosticado**

Los datos fueron pronosticados a partir de los datos del área del estudio de línea base

**BTF-EPA**

Factor de transferencia de carne de vacuno de US EPA 1999

Tabla 4 Valor de Referencia de Toxicidad

|                        |          | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|------------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| Receptor               | PC [kg]  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| jaguar                 | 8.06E+01 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| tapir                  | 2.50E+02 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| mono araña             | 5.48E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| águila crestada        | 2.95E+00 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| martín pescador grande | 3.15E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| armadillo              | 6.00E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| loro cabeciazul        | 2.93E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| zorzalito de swainson  | 3.08E-02 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |

Nota: Se utilizó valores NOAEL para todos los receptores

Tabla 5 Cálculos del Rango de Hábitat

| Receptor                 | Rango de hábitat (ha) | Factor de Rango de Hábitat |
|--------------------------|-----------------------|----------------------------|
| jaguar                   | 3.82E+03              | 1.00                       |
| tapir                    | 1.25E+02              | 1.00                       |
| mono araña               | 2.76E+02              | 1.00                       |
| águila crestada          | 8.00E+02              | 1.00                       |
| martín pescador grande   | 3.90E-01              | 1.00                       |
| armadillo                | 1.00E+01              | 1.00                       |
| loro cabeciazul          | 1.67E+01              | 1.00                       |
| zorzalito de swainson    | 4.20E-01              | 1.00                       |
| Huella del Proyecto (ha) | 41351                 |                            |

Tabla 6 Jaguar

| Jaguar                          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.10                            | peces                         | 1.38E+01 | 1.40E-03  | 6.83E-02 | 1.11E+00 | 9.79E-03 | 1.81E-01 | 1.30E-02 | 2.72E-01 | 3.42E-02 | 2.23E-02  | 5.73E-02 | 5.74E+00  | 2.80E-02 |
| 0.30                            | mamíferos herbívoros grandes  | 1.29E-01 | 7.89E-06  | 6.81E-06 | 9.54E-05 | 5.75E-07 | 7.58E-04 | 1.58E-04 | 2.48E-02 | 3.45E-06 | 3.01E-05  | 1.70E-04 | 6.40E-04  | 1.25E-04 |
| 0.30                            | mamíferos herbívoros pequeños | 1.45E-01 | 7.56E-06  | 3.11E-06 | 2.60E-04 | 7.17E-07 | 8.20E-04 | 8.47E-05 | 2.19E-02 | 1.92E-06 | 9.17E-05  | 9.18E-05 | 7.71E-04  | 3.18E-05 |
| 0.30                            | mamíferos pequeños            | 0.00E+00 | 1.61E-02  | 3.94E-03 | 1.16E-01 | 2.76E-02 | 7.36E-01 | 4.63E-02 | 2.29E+00 | 6.53E-01 | 0.00E+00  | 1.15E-01 | 0.00E+00  | 2.68E-01 |
| Dosis de alimentos (mg/d)       |                               | 1.41E+01 | 1.75E-02  | 7.22E-02 | 1.22E+00 | 3.73E-02 | 9.19E-01 | 5.95E-02 | 2.61E+00 | 6.87E-01 | 2.25E-02  | 1.73E-01 | 5.75E+00  | 2.96E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.41E+01 | 1.75E-02  | 7.22E-02 | 1.22E+00 | 3.73E-02 | 9.19E-01 | 5.95E-02 | 2.61E+00 | 6.87E-01 | 2.25E-02  | 1.73E-01 | 5.75E+00  | 2.96E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.25E+00 | 1.03E-03  | 1.03E-03 | 8.49E-02 | 5.66E-04 | 3.86E-03 | 5.14E-03 | 2.89E-02 | 2.06E-03 | 2.57E-03  | 1.80E-03 | 1.81E-01  | 7.38E-03 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.25E+00 | 1.03E-03  | 1.03E-03 | 8.49E-02 | 5.66E-04 | 3.86E-03 | 5.14E-03 | 2.89E-02 | 2.06E-03 | 2.57E-03  | 1.80E-03 | 1.81E-01  | 7.38E-03 |
| Alimentos + suelo + agua (mg/d) |                               | 1.63E+01 | 1.86E-02  | 7.33E-02 | 1.31E+00 | 3.79E-02 | 9.23E-01 | 6.46E-02 | 2.63E+00 | 6.89E-01 | 2.50E-02  | 1.74E-01 | 5.93E+00  | 3.03E-01 |
| PC ajustado (mg/kg/d)           |                               | 2.03E-01 | 2.30E-04  | 9.09E-04 | 1.62E-02 | 4.70E-04 | 1.15E-02 | 8.02E-04 | 3.27E-02 | 8.55E-03 | 3.11E-04  | 2.16E-03 | 7.35E-02  | 3.76E-03 |
| RH ajustado (mg/kg/d)           |                               | 2.03E-01 | 2.30E-04  | 9.09E-04 | 1.62E-02 | 4.70E-04 | 1.15E-02 | 8.02E-04 | 3.27E-02 | 8.55E-03 | 3.11E-04  | 2.16E-03 | 7.35E-02  | 3.76E-03 |
| Dosis diaria final (mg/kg/día)  |                               | 2.03E-01 | 2.30E-04  | 9.09E-04 | 1.62E-02 | 4.70E-04 | 1.15E-02 | 8.02E-04 | 3.27E-02 | 8.55E-03 | 3.11E-04  | 2.16E-03 | 7.35E-02  | 3.76E-03 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.05E-01 | 3.91E-03  | 8.74E-04 | 3.13E-04 | 6.11E-04 | 4.77E-03 | 1.09E-04 | 5.84E-03 | 1.82E-03 | 1.19E-03  | 1.51E-02 | 2.80E-04  | 9.05E-04 |

| Parámetros del modelo             |          |                                                                                                      |
|-----------------------------------|----------|------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 8.06E+01 | Caselli de Azevedo y Murray 2007 (media de machos y hembras)                                         |
| Ingesta de alimentos (kg/d ph)    | 1.40E+00 | Emmons 1987 (en ph)                                                                                  |
| Ingesta de agua (L/d)             | 5.14E+00 | US EPA 1993 (WIR calculado: Peso corporal promedio utilizado (0.099 Peso^0.9) para machos y hembras) |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                                                      |
| rango de hábitat (ha)             | 3.82E+03 | Caselli de Azevedo y Murray 2007 (ámbito de hogar de machos y hembras utilizado conservadoramente)   |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                      |

Tabla 7 Tapir

| Tapir                           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 4.63E+04 | 3.21E+00  | 1.29E+00 | 3.68E+02 | 5.46E-01 | 7.11E+01 | 2.69E+00 | 1.44E+03 | 2.41E+00 | 2.39E+00  | 6.43E+00 | 1.27E+03  | 5.73E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 4.63E+04 | 3.21E+00  | 1.29E+00 | 3.68E+02 | 5.46E-01 | 7.11E+01 | 2.69E+00 | 1.44E+03 | 2.41E+00 | 2.39E+00  | 6.43E+00 | 1.27E+03  | 5.73E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.63E+04 | 3.21E+00  | 1.29E+00 | 3.68E+02 | 5.46E-01 | 7.11E+01 | 2.69E+00 | 1.44E+03 | 2.41E+00 | 2.39E+00  | 6.43E+00 | 1.27E+03  | 5.73E+00 |
| Dosis de suelo (mg/d)           |                               | 4.65E+03 | 1.48E+00  | 7.39E-01 | 9.92E+00 | 7.39E-02 | 1.10E+01 | 1.99E+00 | 3.57E+01 | 4.44E+00 | 5.91E-01  | 2.96E-01 | 9.23E-01  | 2.39E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.65E+03 | 1.48E+00  | 7.39E-01 | 9.92E+00 | 7.39E-02 | 1.10E+01 | 1.99E+00 | 3.57E+01 | 4.44E+00 | 5.91E-01  | 2.96E-01 | 9.23E-01  | 2.39E+01 |
| Dosis de agua (mg/d)            |                               | 6.23E+00 | 2.85E-03  | 2.85E-03 | 2.35E-01 | 1.57E-03 | 1.07E-02 | 1.42E-02 | 7.99E-02 | 5.70E-03 | 7.12E-03  | 4.99E-03 | 5.01E-01  | 2.04E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.23E+00 | 2.85E-03  | 2.85E-03 | 2.35E-01 | 1.57E-03 | 1.07E-02 | 1.42E-02 | 7.99E-02 | 5.70E-03 | 7.12E-03  | 4.99E-03 | 5.01E-01  | 2.04E-02 |
| Alimentos + suelo + agua (mg/d) |                               | 5.10E+04 | 4.70E+00  | 2.03E+00 | 3.79E+02 | 6.22E-01 | 8.21E+01 | 4.70E+00 | 1.48E+03 | 6.85E+00 | 2.99E+00  | 6.73E+00 | 1.27E+03  | 2.97E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.04E+02 | 1.88E-02  | 8.11E-03 | 1.51E+00 | 2.49E-03 | 3.28E-01 | 1.88E-02 | 5.90E+00 | 2.74E-02 | 1.20E-02  | 2.69E-02 | 5.08E+00  | 1.19E-01 |
| RH ajustado (mg/kg/d)           |                               | 2.04E+02 | 1.88E-02  | 8.11E-03 | 1.51E+00 | 2.49E-03 | 3.28E-01 | 1.88E-02 | 5.90E+00 | 2.74E-02 | 1.20E-02  | 2.69E-02 | 5.08E+00  | 1.19E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.04E+02 | 1.88E-02  | 8.11E-03 | 1.51E+00 | 2.49E-03 | 3.28E-01 | 1.88E-02 | 5.90E+00 | 2.74E-02 | 1.20E-02  | 2.69E-02 | 5.08E+00  | 1.19E-01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.06E+02 | 3.18E-01  | 7.80E-03 | 2.92E-02 | 3.23E-03 | 1.37E-01 | 2.56E-03 | 1.05E+00 | 5.83E-03 | 4.60E-02  | 1.88E-01 | 1.93E-02  | 2.86E-02 |

| Parámetros del modelo             |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.50E+02 | Foerster et al. 2000 (estimado medio utilizado)                              |
| Ingesta de alimentos (kg/d ph)    | 2.07E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 1.42E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 1.48E-01 | Beyer et al. 1994 (2.3% para jabalí)                                         |
| Rango de hábitat (ha)             | 1.25E+02 | Foerster y Vaughan 2002 (promedio utilizado)                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |



Tabla 8 Mono Araña

| Mono Araña                      |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.20                            | hojas                         | 4.97E+02 | 3.45E-02  | 1.38E-02 | 3.95E+00 | 5.86E-03 | 7.63E-01 | 2.88E-02 | 1.55E+01 | 2.59E-02 | 2.57E-02  | 6.90E-02 | 1.36E+01  | 6.14E-02 |
| 0.80                            | fruta                         | 7.60E+02 | 6.41E-02  | 6.41E-03 | 1.86E+01 | 1.11E-02 | 1.18E+00 | 2.59E-02 | 1.31E+01 | 5.77E-02 | 1.73E-01  | 1.07E-02 | 1.99E+01  | 1.04E-01 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.26E+03 | 9.86E-02  | 2.02E-02 | 2.26E+01 | 1.70E-02 | 1.95E+00 | 5.48E-02 | 2.85E+01 | 8.35E-02 | 1.99E-01  | 7.97E-02 | 3.35E+01  | 1.65E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.26E+03 | 9.86E-02  | 2.02E-02 | 2.26E+01 | 1.70E-02 | 1.95E+00 | 5.48E-02 | 2.85E+01 | 8.35E-02 | 1.99E-01  | 7.97E-02 | 3.35E+01  | 1.65E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.00E-01 | 9.15E-05  | 9.15E-05 | 7.55E-03 | 5.03E-05 | 3.43E-04 | 4.58E-04 | 2.57E-03 | 1.83E-04 | 2.29E-04  | 1.60E-04 | 1.61E-02  | 6.56E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.00E-01 | 9.15E-05  | 9.15E-05 | 7.55E-03 | 5.03E-05 | 3.43E-04 | 4.58E-04 | 2.57E-03 | 1.83E-04 | 2.29E-04  | 1.60E-04 | 1.61E-02  | 6.56E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.26E+03 | 9.87E-02  | 2.03E-02 | 2.26E+01 | 1.70E-02 | 1.95E+00 | 5.52E-02 | 2.85E+01 | 8.37E-02 | 1.99E-01  | 7.98E-02 | 3.35E+01  | 1.66E-01 |
| PC ajustado (mg/kg/d)           |                               | 2.29E+02 | 1.80E-02  | 3.70E-03 | 4.12E+00 | 3.11E-03 | 3.55E-01 | 1.01E-02 | 5.21E+00 | 1.53E-02 | 3.64E-02  | 1.46E-02 | 6.12E+00  | 3.03E-02 |
| RH ajustado (mg/kg/d)           |                               | 2.29E+02 | 1.80E-02  | 3.70E-03 | 4.12E+00 | 3.11E-03 | 3.55E-01 | 1.01E-02 | 5.21E+00 | 1.53E-02 | 3.64E-02  | 1.46E-02 | 6.12E+00  | 3.03E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 2.29E+02 | 1.80E-02  | 3.70E-03 | 4.12E+00 | 3.11E-03 | 3.55E-01 | 1.01E-02 | 5.21E+00 | 1.53E-02 | 3.64E-02  | 1.46E-02 | 6.12E+00  | 3.03E-02 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.19E+02 | 3.05E-01  | 3.56E-03 | 7.96E-02 | 4.03E-03 | 1.48E-01 | 1.38E-03 | 9.30E-01 | 3.25E-03 | 1.40E-01  | 1.02E-01 | 2.33E-02  | 7.28E-03 |

| Parámetros del modelo             |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 5.48E+00 | Clark.G. 1944 (media de 19 monos araña adultos)                              |
| Ingesta de alimentos (kg/d ph)    | 1.11E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 4.58E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                              |
| Rango de hábitat (ha)             | 2.76E+02 | Wallace 2008 (promedio de ámbitos de hogar presentado en la Tabla 1)         |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |





Tabla 9      Águila Crestada

| Águila Crestada                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.50                            | mamíferos herbívoros pequeños | 3.36E-02 | 1.76E-06  | 7.23E-07 | 6.04E-05 | 1.67E-07 | 1.91E-04 | 1.97E-05 | 5.08E-03 | 4.47E-07 | 2.13E-05  | 2.13E-05 | 1.79E-04  | 7.38E-06 |
| 0.50                            | mamíferos pequeños            | 0.00E+00 | 3.75E-03  | 9.16E-04 | 2.68E-02 | 6.40E-03 | 1.71E-01 | 1.08E-02 | 5.31E-01 | 1.52E-01 | 0.00E+00  | 2.67E-02 | 0.00E+00  | 6.22E-02 |
| Dosis de alimentos (mg/d)       |                               | 3.36E-02 | 3.75E-03  | 9.16E-04 | 2.69E-02 | 6.40E-03 | 1.71E-01 | 1.08E-02 | 5.36E-01 | 1.52E-01 | 2.13E-05  | 2.68E-02 | 1.79E-04  | 6.22E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.36E-02 | 3.75E-03  | 9.16E-04 | 2.69E-02 | 6.40E-03 | 1.71E-01 | 1.08E-02 | 5.36E-01 | 1.52E-01 | 2.13E-05  | 2.68E-02 | 1.79E-04  | 6.22E-02 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 5.33E-02 | 2.44E-05  | 2.44E-05 | 2.01E-03 | 1.34E-05 | 9.13E-05 | 1.22E-04 | 6.83E-04 | 4.87E-05 | 6.09E-05  | 4.26E-05 | 4.28E-03  | 1.75E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 5.33E-02 | 2.44E-05  | 2.44E-05 | 2.01E-03 | 1.34E-05 | 9.13E-05 | 1.22E-04 | 6.83E-04 | 4.87E-05 | 6.09E-05  | 4.26E-05 | 4.28E-03  | 1.75E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 8.69E-02 | 3.77E-03  | 9.41E-04 | 2.89E-02 | 6.42E-03 | 1.71E-01 | 1.09E-02 | 5.37E-01 | 1.52E-01 | 8.22E-05  | 2.68E-02 | 4.46E-03  | 6.24E-02 |
| PC ajustado (mg/kg/d)           |                               | 2.94E-02 | 1.28E-03  | 3.19E-04 | 9.80E-03 | 2.17E-03 | 5.81E-02 | 3.69E-03 | 1.82E-01 | 5.14E-02 | 2.79E-05  | 9.09E-03 | 1.51E-03  | 2.11E-02 |
| RH ajustado (mg/kg/d)           |                               | 2.94E-02 | 1.28E-03  | 3.19E-04 | 9.80E-03 | 2.17E-03 | 5.81E-02 | 3.69E-03 | 1.82E-01 | 5.14E-02 | 2.79E-05  | 9.09E-03 | 1.51E-03  | 2.11E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 2.94E-02 | 1.28E-03  | 3.19E-04 | 9.80E-03 | 2.17E-03 | 5.81E-02 | 3.69E-03 | 1.82E-01 | 5.14E-02 | 2.79E-05  | 9.09E-03 | 1.51E-03  | 2.11E-02 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 7.06E-03 | NA        | 1.42E-04 | 4.71E-04 | 1.48E-03 | 2.18E-02 | 4.85E-04 | 4.49E-02 | 3.15E-02 | 7.96E-06  | 3.13E-02 | 5.67E-06  | 6.15E-02 |

| Parámetros del modelo             |          |                                            |
|-----------------------------------|----------|--------------------------------------------|
| Peso corporal (PC; kg)            | 2.95E+00 | Kiff et al., 1989                          |
| Ingesta de alimentos (kg/d ph)    | 1.95E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de agua (L/d)             | 1.22E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | US EPA 1993 (águila calva)                 |
| Rango de hábitat (ha)             | 8.00E+02 | Robinson 1994                              |
| Factor de rango de hábitat (RH)   | 1.000    |                                            |



Tabla 10    Martín Pescador Grande

| Martín Pescador Grande          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | peces                         | 1.58E+01 | 1.60E-03  | 7.79E-02 | 1.26E+00 | 1.12E-02 | 2.07E-01 | 1.48E-02 | 3.11E-01 | 3.90E-02 | 2.55E-02  | 6.53E-02 | 6.55E+00  | 3.19E-02 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.58E+01 | 1.60E-03  | 7.79E-02 | 1.26E+00 | 1.12E-02 | 2.07E-01 | 1.48E-02 | 3.11E-01 | 3.90E-02 | 2.55E-02  | 6.53E-02 | 6.55E+00  | 3.19E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.58E+01 | 1.60E-03  | 7.79E-02 | 1.26E+00 | 1.12E-02 | 2.07E-01 | 1.48E-02 | 3.11E-01 | 3.90E-02 | 2.55E-02  | 6.53E-02 | 6.55E+00  | 3.19E-02 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 1.49E-02 | 6.81E-06  | 6.81E-06 | 5.62E-04 | 3.75E-06 | 2.55E-05 | 3.41E-05 | 1.91E-04 | 1.36E-05 | 1.70E-05  | 1.19E-05 | 1.20E-03  | 4.88E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.49E-02 | 6.81E-06  | 6.81E-06 | 5.62E-04 | 3.75E-06 | 2.55E-05 | 3.41E-05 | 1.91E-04 | 1.36E-05 | 1.70E-05  | 1.19E-05 | 1.20E-03  | 4.88E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 1.58E+01 | 1.60E-03  | 7.79E-02 | 1.26E+00 | 1.12E-02 | 2.07E-01 | 1.48E-02 | 3.11E-01 | 3.91E-02 | 2.55E-02  | 6.53E-02 | 6.55E+00  | 3.20E-02 |
| PC ajustado (mg/kg/d)           |                               | 5.01E+01 | 5.09E-03  | 2.47E-01 | 4.01E+00 | 3.54E-02 | 6.56E-01 | 4.71E-02 | 9.87E-01 | 1.24E-01 | 8.09E-02  | 2.07E-01 | 2.08E+01  | 1.02E-01 |
| RH ajustado (mg/kg/d)           |                               | 5.01E+01 | 5.09E-03  | 2.47E-01 | 4.01E+00 | 3.54E-02 | 6.56E-01 | 4.71E-02 | 9.87E-01 | 1.24E-01 | 8.09E-02  | 2.07E-01 | 2.08E+01  | 1.02E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 5.01E+01 | 5.09E-03  | 2.47E-01 | 4.01E+00 | 3.54E-02 | 6.56E-01 | 4.71E-02 | 9.87E-01 | 1.24E-01 | 8.09E-02  | 2.07E-01 | 2.08E+01  | 1.02E-01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1.20E+01 | NA        | 1.10E-01 | 1.93E-01 | 2.41E-02 | 2.47E-01 | 6.19E-03 | 2.44E-01 | 7.61E-02 | 2.31E-02  | 7.15E-01 | 7.79E-02  | 2.95E-01 |

| Parámetros del modelo             |          |                                                                                                         |
|-----------------------------------|----------|---------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.15E-01 | Wildbirds Unlimited, 2009                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.60E-01 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de agua (L/d)             | 3.41E-02 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Rango de hábitat (ha)             | 3.90E-01 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                         |



Tabla 11 Armadillo

| Armadillo                       |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 1.00                            | gusanos                       | 7.90E+03 | 3.00E+00  | 6.03E-01 | 3.44E+01 | 5.57E-01 | 1.15E+01 | 4.27E+00 | 3.13E+01 | 7.61E+01 | 3.17E-01  | 2.41E+00 | 1.74E+01  | 2.67E+01 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 7.90E+03 | 3.00E+00  | 6.03E-01 | 3.44E+01 | 5.57E-01 | 1.15E+01 | 4.27E+00 | 3.13E+01 | 7.61E+01 | 3.17E-01  | 2.41E+00 | 1.74E+01  | 2.67E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 7.90E+03 | 3.00E+00  | 6.03E-01 | 3.44E+01 | 5.57E-01 | 1.15E+01 | 4.27E+00 | 3.13E+01 | 7.61E+01 | 3.17E-01  | 2.41E+00 | 1.74E+01  | 2.67E+01 |
| Dosis de suelo (mg/d)           |                               | 1.61E+03 | 5.10E-01  | 2.55E-01 | 3.42E+00 | 2.55E-02 | 3.79E+00 | 6.88E-01 | 1.23E+01 | 1.53E+00 | 2.04E-01  | 1.02E-01 | 3.19E-01  | 8.26E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.61E+03 | 5.10E-01  | 2.55E-01 | 3.42E+00 | 2.55E-02 | 3.79E+00 | 6.88E-01 | 1.23E+01 | 1.53E+00 | 2.04E-01  | 1.02E-01 | 3.19E-01  | 8.26E+00 |
| Dosis de agua (mg/d)            |                               | 2.19E-01 | 1.00E-04  | 1.00E-04 | 8.25E-03 | 5.50E-05 | 3.75E-04 | 5.00E-04 | 2.80E-03 | 2.00E-04 | 2.50E-04  | 1.75E-04 | 1.76E-02  | 7.17E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.19E-01 | 1.00E-04  | 1.00E-04 | 8.25E-03 | 5.50E-05 | 3.75E-04 | 5.00E-04 | 2.80E-03 | 2.00E-04 | 2.50E-04  | 1.75E-04 | 1.76E-02  | 7.17E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 9.51E+03 | 3.51E+00  | 8.58E-01 | 3.78E+01 | 5.82E-01 | 1.53E+01 | 4.96E+00 | 4.36E+01 | 7.76E+01 | 5.21E-01  | 2.51E+00 | 1.78E+01  | 3.49E+01 |
| PC ajustado (mg/kg/d)           |                               | 1.58E+03 | 5.85E-01  | 1.43E-01 | 6.30E+00 | 9.71E-02 | 2.55E+00 | 8.26E-01 | 7.27E+00 | 1.29E+01 | 8.68E-02  | 4.18E-01 | 2.96E+00  | 5.82E+00 |
| RH ajustado (mg/kg/d)           |                               | 1.58E+03 | 5.85E-01  | 1.43E-01 | 6.30E+00 | 9.71E-02 | 2.55E+00 | 8.26E-01 | 7.27E+00 | 1.29E+01 | 8.68E-02  | 4.18E-01 | 2.96E+00  | 5.82E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 1.58E+03 | 5.85E-01  | 1.43E-01 | 6.30E+00 | 9.71E-02 | 2.55E+00 | 8.26E-01 | 7.27E+00 | 1.29E+01 | 8.68E-02  | 4.18E-01 | 2.96E+00  | 5.82E+00 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 8.21E+02 | 9.92E+00  | 1.38E-01 | 1.22E-01 | 1.26E-01 | 1.06E+00 | 1.13E-01 | 1.30E+00 | 2.75E+00 | 3.34E-01  | 2.92E+00 | 1.13E-02  | 1.40E+00 |

| Parámetros del modelo             |          |                                                      |
|-----------------------------------|----------|------------------------------------------------------|
| Peso corporal (PC; kg)            | 6.00E+00 | Frappell et al. 1998                                 |
| Ingesta de alimentos (kg/d)       | 1.25E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de agua (L/d)             | 5.00E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de suelo/sedimento (kg/d) | 5.10E-02 | Beyer et al., 1994 (17% del CIA)                     |
| Rango de hábitat (ha)             | 1.00E+01 | Loughry et al., 1997                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                      |



Tabla 12 Loro Cabeciazul

| Loro Cabeciazul                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | fruta                         | 9.31E+01 | 7.85E-03  | 7.85E-04 | 2.28E+00 | 1.36E-03 | 1.45E-01 | 3.18E-03 | 1.60E+00 | 7.07E-03 | 2.13E-02  | 1.31E-03 | 2.44E+00  | 1.27E-02 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 9.31E+01 | 7.85E-03  | 7.85E-04 | 2.28E+00 | 1.36E-03 | 1.45E-01 | 3.18E-03 | 1.60E+00 | 7.07E-03 | 2.13E-02  | 1.31E-03 | 2.44E+00  | 1.27E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 9.31E+01 | 7.85E-03  | 7.85E-04 | 2.28E+00 | 1.36E-03 | 1.45E-01 | 3.18E-03 | 1.60E+00 | 7.07E-03 | 2.13E-02  | 1.31E-03 | 2.44E+00  | 1.27E-02 |
| Dosis de suelo (mg/d)           |                               | 8.24E+01 | 2.62E-02  | 1.31E-02 | 1.76E-01 | 1.31E-03 | 1.94E-01 | 3.53E-02 | 6.31E-01 | 7.85E-02 | 1.05E-02  | 5.23E-03 | 1.63E-02  | 4.24E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 8.24E+01 | 2.62E-02  | 1.31E-02 | 1.76E-01 | 1.31E-03 | 1.94E-01 | 3.53E-02 | 6.31E-01 | 7.85E-02 | 1.05E-02  | 5.23E-03 | 1.63E-02  | 4.24E-01 |
| Dosis de agua (mg/d)            |                               | 1.13E-02 | 5.18E-06  | 5.18E-06 | 4.28E-04 | 2.85E-06 | 1.94E-05 | 2.59E-05 | 1.45E-04 | 1.04E-05 | 1.30E-05  | 9.07E-06 | 9.12E-04  | 3.72E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.13E-02 | 5.18E-06  | 5.18E-06 | 4.28E-04 | 2.85E-06 | 1.94E-05 | 2.59E-05 | 1.45E-04 | 1.04E-05 | 1.30E-05  | 9.07E-06 | 9.12E-04  | 3.72E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 1.75E+02 | 3.40E-02  | 1.39E-02 | 2.46E+00 | 2.67E-03 | 3.39E-01 | 3.85E-02 | 2.23E+00 | 8.56E-02 | 3.17E-02  | 6.55E-03 | 2.45E+00  | 4.37E-01 |
| PC ajustado (mg/kg/d)           |                               | 5.99E+02 | 1.16E-01  | 4.74E-02 | 8.39E+00 | 9.12E-03 | 1.16E+00 | 1.31E-01 | 7.63E+00 | 2.92E-01 | 1.08E-01  | 2.24E-02 | 8.37E+00  | 1.49E+00 |
| RH ajustado (mg/kg/d)           |                               | 5.99E+02 | 1.16E-01  | 4.74E-02 | 8.39E+00 | 9.12E-03 | 1.16E+00 | 1.31E-01 | 7.63E+00 | 2.92E-01 | 1.08E-01  | 2.24E-02 | 8.37E+00  | 1.49E+00 |
| CS ajustada (mg/kg/d)           |                               | 5.99E+02 | 1.16E-01  | 4.74E-02 | 8.39E+00 | 9.12E-03 | 1.16E+00 | 1.31E-01 | 7.63E+00 | 2.92E-01 | 1.08E-01  | 2.24E-02 | 8.37E+00  | 1.49E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 5.99E+02 | 1.16E-01  | 4.74E-02 | 8.39E+00 | 9.12E-03 | 1.16E+00 | 1.31E-01 | 7.63E+00 | 2.92E-01 | 1.08E-01  | 2.24E-02 | 8.37E+00  | 1.49E+00 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 143.6    | NA        | 2.1E-02  | 0.4      | 6.2E-03  | 0.4      | 1.7E-02  | 1.9      | 0.2      | 3.1E-02   | 0.1      | 3.1E-02   | 4.3      |

| Parámetros del modelo             |          |                                                                                                    |
|-----------------------------------|----------|----------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.93E-01 | Gilardi y Munn, 1988                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.09E-01 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de agua (L/d)             | 2.59E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de suelo/sedimento (kg/d) | 2.62E-03 | Se asume que sea el 10% del CIA debido a las marcas dejadas por las aves en las paredes de arcilla |
| rango de hábitat (ha)             | 1.67E+01 | Robinson et al. 2000                                                                               |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                    |
| Factor de cubierta de suelo (CS)  | 1.00     |                                                                                                    |



Tabla 13    Zorzalito de Swainson

| Zorzalito de Swainson           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la dieta                   | Dosis (mg/d)                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 1.00                            | gusanos                       | 1.59E+02 | 6.04E-02  | 1.21E-02 | 6.92E-01 | 1.12E-02 | 2.31E-01 | 8.59E-02 | 6.31E-01 | 1.53E+00 | 6.38E-03  | 4.84E-02 | 3.51E-01  | 5.37E-01 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.59E+02 | 6.04E-02  | 1.21E-02 | 6.92E-01 | 1.12E-02 | 2.31E-01 | 8.59E-02 | 6.31E-01 | 1.53E+00 | 6.38E-03  | 4.84E-02 | 3.51E-01  | 5.37E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.59E+02 | 6.04E-02  | 1.21E-02 | 6.92E-01 | 1.12E-02 | 2.31E-01 | 8.59E-02 | 6.31E-01 | 1.53E+00 | 6.38E-03  | 4.84E-02 | 3.51E-01  | 5.37E-01 |
| Dosis de suelo (mg/d)           |                               | 3.95E+00 | 1.26E-03  | 6.28E-04 | 8.43E-03 | 6.28E-05 | 9.32E-03 | 1.69E-03 | 3.03E-02 | 3.77E-03 | 5.02E-04  | 2.51E-04 | 7.85E-04  | 2.03E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.95E+00 | 1.26E-03  | 6.28E-04 | 8.43E-03 | 6.28E-05 | 9.32E-03 | 1.69E-03 | 3.03E-02 | 3.77E-03 | 5.02E-04  | 2.51E-04 | 7.85E-04  | 2.03E-02 |
| Dosis de agua (mg/d)            |                               | 2.51E-03 | 1.15E-06  | 1.15E-06 | 9.45E-05 | 6.30E-07 | 4.30E-06 | 5.73E-06 | 3.21E-05 | 2.29E-06 | 2.87E-06  | 2.01E-06 | 2.02E-04  | 8.22E-06 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.51E-03 | 1.15E-06  | 1.15E-06 | 9.45E-05 | 6.30E-07 | 4.30E-06 | 5.73E-06 | 3.21E-05 | 2.29E-06 | 2.87E-06  | 2.01E-06 | 2.02E-04  | 8.22E-06 |
| Alimentos + suelo + agua (mg/d) |                               | 1.63E+02 | 6.16E-02  | 1.28E-02 | 7.01E-01 | 1.13E-02 | 2.41E-01 | 8.76E-02 | 6.61E-01 | 1.53E+00 | 6.88E-03  | 4.87E-02 | 3.52E-01  | 5.57E-01 |
| PC ajustado (mg/kg/d)           |                               | 5.29E+03 | 2.00E+00  | 4.15E-01 | 2.28E+01 | 3.66E-01 | 7.82E+00 | 2.85E+00 | 2.15E+01 | 4.98E+01 | 2.23E-01  | 1.58E+00 | 1.14E+01  | 1.81E+01 |
| RH ajustado (mg/kg/d)           |                               | 5.29E+03 | 2.00E+00  | 4.15E-01 | 2.28E+01 | 3.66E-01 | 7.82E+00 | 2.85E+00 | 2.15E+01 | 4.98E+01 | 2.23E-01  | 1.58E+00 | 1.14E+01  | 1.81E+01 |
| CS ajustada (mg/kg/d)           |                               | 5.29E+03 | 2.00E+00  | 4.15E-01 | 2.28E+01 | 3.66E-01 | 7.82E+00 | 2.85E+00 | 2.15E+01 | 4.98E+01 | 2.23E-01  | 1.58E+00 | 1.14E+01  | 1.81E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 5.29E+03 | 2.00E+00  | 4.15E-01 | 2.28E+01 | 3.66E-01 | 7.82E+00 | 2.85E+00 | 2.15E+01 | 4.98E+01 | 2.23E-01  | 1.58E+00 | 1.14E+01  | 1.81E+01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1269.6   | NA        | 0.2      | 1.1      | 0.2      | 2.9      | 0.4      | 5.3      | 30.6     | 0.1       | 5.5      | 4.3E-02   | 52.6     |

| Parámetros del modelo             |          |                                                                |
|-----------------------------------|----------|----------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.08E-02 | Dunning 1984 (valor medio utilizado)                           |
| Ingesta de alimentos (kg/d ph)    | 2.52E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de agua (L/d)             | 5.73E-03 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 1.26E-04 | Sample y Suter, 1994; ingesta de suelo del petirrojo americano |
| Rango de hábitat (km)             | 4.20E-01 | Sample y Suter, 1994; rango de hábitat del petirrojo americano |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                |



2 ESTIMADO DE TENDENCIAS CENTRALES PARA LA EVALUACIÓN DE IMPACTOS

Tabla 14    Página De Resumen

|                        |                                                    |           |               |         |                                 |                                           |           |                                        |         |           |                                                                                     |           |         |
|------------------------|----------------------------------------------------|-----------|---------------|---------|---------------------------------|-------------------------------------------|-----------|----------------------------------------|---------|-----------|-------------------------------------------------------------------------------------|-----------|---------|
| Nombre del Proyecto    | Mina Petaquilla                                    |           |               |         |                                 |                                           | Archivos: | (1) Página de Resumen                  |         |           |  |           |         |
| Número de Proyecto     | 07-1334-0018                                       |           | Creado por:   | LSC     | (2) Concentraciones Ambientales |                                           |           |                                        |         |           |                                                                                     |           |         |
| Fecha:                 | 10 de Junio de 2010                                |           | Revisado por: | ADB     | (3) Modelos de Absorción        |                                           |           |                                        |         |           |                                                                                     |           |         |
| Notas:                 | Caso de Impacto - Estimado de Tendencias Centrales |           |               |         |                                 |                                           |           | (4) Valores de Referencia de Toxicidad |         |           |                                                                                     |           |         |
|                        |                                                    |           |               |         |                                 |                                           |           | (5) Cálculos del Rango de Hábitat      |         |           |                                                                                     |           |         |
|                        |                                                    |           |               |         |                                 | (6) Páginas de Cálculo Para Cada Receptor |           |                                        |         |           |                                                                                     |           |         |
|                        | Aluminio                                           | Antimonio | Arsénico      | Bario   | Cadmio                          | Cromo                                     | Cobalto   | Cobre                                  | Plomo   | Molibdeno | Selenio                                                                             | Estroncio | Vanadio |
| jaguar                 | 0.1092                                             | 0.0039    | 0.0046        | 0.0005  | 0.0009                          | 0.0051                                    | 0.0002    | 0.0080                                 | 0.0019  | 0.0214    | 0.0232                                                                              | 0.0003    | 0.0009  |
| tapir                  | 105.91                                             | 0.32      | 0.01          | 0.03    | 0.01                            | 0.14                                      | 2.7E-03   | 5.37                                   | 0.01    | 0.05      | 0.52                                                                                | 0.02      | 0.03    |
| mono araña             | 119.15                                             | 0.31      | 0.01          | 0.08    | 0.01                            | 0.16                                      | 1.5E-03   | 5.00                                   | 4.7E-03 | 0.15      | 0.33                                                                                | 0.02      | 0.01    |
| águila crestada        | 0.01                                               | NA        | 1.9E-04       | 1.6E-04 | 1.9E-03                         | 0.02                                      | 5.0E-04   | 0.06                                   | 0.03    | 9.0E-05   | 0.05                                                                                | 5.7E-06   | 0.06    |
| martín pescador grande | 13.20                                              | NA        | 0.60          | 0.32    | 0.05                            | 0.31                                      | 0.03      | 0.40                                   | 0.09    | 0.42      | 1.23                                                                                | 0.08      | 0.29    |
| armadillo              | 822.61                                             | 9.96      | 0.17          | 0.12    | 0.21                            | 1.08                                      | 0.11      | 3.21                                   | 2.95    | 0.34      | 7.68                                                                                | 0.01      | 1.45    |
| loro cabeciazul        | 143.95                                             | NA        | 0.03          | 0.40    | 0.01                            | 0.45                                      | 0.02      | 10.30                                  | 0.20    | 0.03      | 0.25                                                                                | 0.03      | 4.59    |
| zorzalito de swainson  | 1271.80                                            | NA        | 0.23          | 1.10    | 0.42                            | 2.99                                      | 0.38      | 8.94                                   | 32.77   | 0.07      | 14.32                                                                               | 0.04      | 54.66   |



Tabla 15    Concentraciones Ambientales

|                               |                      | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  | Porcentaje de Humedad |
|-------------------------------|----------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|-----------------------|
| Ítem                          | Unidades             |          |           |          |          |          |          |          |          |          |           |          |           |          |                       |
| suelo                         | mg/kg de peso seco   | 3.15E+04 | 1.00E+01  | 6.09E+00 | 6.73E+01 | 8.38E-01 | 7.65E+01 | 1.38E+01 | 1.17E+03 | 3.22E+01 | 4.06E+00  | 5.25E+00 | 6.49E+00  | 1.68E+02 |                       |
| agua                          | mg/L                 | 2.93E-01 | 2.00E-04  | 1.36E-03 | 2.67E-02 | 9.53E-05 | 4.07E-04 | 1.49E-03 | 6.27E-03 | 3.40E-04 | 7.43E-03  | 5.60E-04 | 3.52E-02  | 9.87E-04 |                       |
| gusanos                       | mg/kg de peso húmedo | 6.33E+03 | 2.41E+00  | 5.88E-01 | 2.75E+01 | 7.46E-01 | 9.35E+00 | 3.48E+00 | 3.84E+01 | 6.52E+01 | 2.57E-01  | 5.06E+00 | 1.45E+01  | 2.22E+01 | 0.76                  |
| hojas                         | mg/kg de peso húmedo | 2.24E+03 | 1.56E-01  | 9.26E-02 | 1.78E+01 | 5.03E-02 | 3.57E+00 | 1.37E-01 | 3.54E+02 | 1.60E-01 | 1.18E-01  | 8.66E-01 | 6.36E+01  | 3.94E-01 | 0.69                  |
| fruta                         | mg/kg de peso húmedo | 8.56E+02 | 7.29E-02  | 2.20E-02 | 2.10E+01 | 2.57E-02 | 1.40E+00 | 3.34E-02 | 8.39E+01 | 9.72E-02 | 1.99E-01  | 7.12E-02 | 2.32E+01  | 2.04E-01 | 0.76                  |
| peces                         | mg/kg de peso húmedo | 1.09E+02 | 1.00E-02  | 2.64E+00 | 1.29E+01 | 1.39E-01 | 1.63E+00 | 4.16E-01 | 3.18E+00 | 2.79E-01 | 2.93E+00  | 7.02E-01 | 4.10E+01  | 1.93E-01 | 0.75                  |
| mamíferos herbívoros grandes  | mg/kg de peso húmedo | 3.07E-01 | 1.89E-05  | 2.27E-05 | 2.28E-04 | 2.57E-06 | 1.88E-03 | 3.92E-04 | 3.01E-01 | 9.70E-06 | 7.59E-05  | 1.12E-03 | 1.58E-03  | 3.31E-04 | 0.68                  |
| mamíferos herbívoros pequeños | mg/kg de peso húmedo | 3.45E-01 | 1.82E-05  | 1.49E-05 | 6.20E-04 | 3.42E-06 | 2.05E-03 | 2.22E-04 | 2.80E-01 | 6.70E-06 | 2.26E-04  | 7.01E-04 | 1.91E-03  | 1.23E-04 | 0.68                  |
| mamíferos pequeños            | mg/kg de peso húmedo |          | 3.86E-02  | 1.10E-02 | 6.61E-02 | 8.37E-02 | 1.79E+00 | 1.13E-01 | 6.84E+00 | 1.60E+00 |           | 3.94E-01 |           | 6.62E-01 | 0.68                  |

Notas: La concentración en mamíferos herbívoros grandes se calcula a partir de la dosis diaria final del tapir \* BTF (ORNL 1984).  
La concentración en mamíferos herbívoros pequeños se calcula a partir de la dosis diaria final del mono araña \* BTF (ORNL 1984).

Tabla 16 Modelos de Absorción

|       |   |                               | Aluminio     | Antimonio    | Arsénico     | Bario        | Cadmio       | Cromo        | Cobalto      | Cobre        | Plomo        | Molibdeno    | Selenio      | Estroncio    | Vanadio      |
|-------|---|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Medio | a | Ítem                          |              |              |              |              |              |              |              |              |              |              |              |              |              |
| suelo | a | gusanos                       | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| suelo | a | hojas                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| suelo | a | fruta                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| suelo | a | peces                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| suelo | a | mamíferos herbívoros grandes  | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| suelo | a | mamíferos herbívoros pequeños | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| suelo | a | mamíferos pequeños            |              | BAF-ECO      | LR-ECO       | BAF-ECO      | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       |              | LR-ECO       |              | BAF-ECO      |

**LEYENDA:** **BTF-ORNL** Factor de transferencia de la carne de vacuno a partir de los informes del Oak Ridge National Laboratory  
**LR-ORNL** Regresión lineal a partir de los informes del Oak Ridge National Laboratory  
**BAF-ORNL** Factor de bioacumulación a partir de los informes del Oak Ridge National Laboratory  
**BAF-ECO** Factor de bioacumulación de ECO-SSL  
**Pronosticado** Los datos fueron pronosticados a partir de los datos del área del estudio de línea base  
**BTF-EPA** Factor de transferencia de carne de vacuno de US EPA 1999



Tabla 17 Valor de Referencia de Toxicidad

|                        |          | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|------------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| Receptor               | PC [kg]  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| jaguar                 | 8.06E+01 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| tapir                  | 2.50E+02 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| mono araña             | 5.48E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| águila crestada        | 2.95E+00 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| martín pescador grande | 3.15E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| armadillo              | 6.00E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| loro cabeciazul        | 2.93E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| zorzalito de swainson  | 3.08E-02 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |

Nota: Se utilizó valores NOAEL para todos los receptores.

Tabla 18 Cálculos del Rango de Hábitat

| Receptor                 | Rango de Hábitat (ha) | Factor de Rango de Hábitat |
|--------------------------|-----------------------|----------------------------|
| jaguar                   | 3.82E+03              | 1.00                       |
| tapir                    | 1.25E+02              | 1.00                       |
| mono araña               | 2.76E+02              | 1.00                       |
| águila crestada          | 8.00E+02              | 1.00                       |
| martín pescador grande   | 3.90E-01              | 1.00                       |
| armadillo                | 1.00E+01              | 1.00                       |
| loro cabeciazul          | 1.67E+01              | 1.00                       |
| zorzalito de swainson    | 4.20E-01              | 1.00                       |
| Huella del Proyecto (ha) | 41351                 |                            |

Tabla 19 Jaguar

| Jaguar                          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.10                            | peces                         | 1.52E+01 | 1.40E-03  | 3.70E-01 | 1.81E+00 | 1.94E-02 | 2.29E-01 | 5.83E-02 | 4.45E-01 | 3.90E-02 | 4.10E-01  | 9.83E-02 | 5.74E+00  | 2.71E-02 |
| 0.30                            | mamíferos herbívoros grandes  | 1.29E-01 | 7.95E-06  | 9.54E-06 | 9.56E-05 | 1.08E-06 | 7.89E-04 | 1.65E-04 | 1.26E-01 | 4.08E-06 | 3.19E-05  | 4.72E-04 | 6.65E-04  | 1.39E-04 |
| 0.30                            | mamíferos herbívoros pequeños | 1.45E-01 | 7.64E-06  | 6.26E-06 | 2.61E-04 | 1.44E-06 | 8.60E-04 | 9.33E-05 | 1.18E-01 | 2.81E-06 | 9.51E-05  | 2.95E-04 | 8.00E-04  | 5.18E-05 |
| 0.30                            | mamíferos pequeños            | 0.00E+00 | 1.62E-02  | 4.63E-03 | 2.78E-02 | 3.52E-02 | 7.53E-01 | 4.75E-02 | 2.87E+00 | 6.73E-01 | 0.00E+00  | 1.66E-01 | 0.00E+00  | 2.78E-01 |
| Dosis de alimentos (mg/d)       |                               | 1.55E+01 | 1.76E-02  | 3.75E-01 | 1.84E+00 | 5.46E-02 | 9.83E-01 | 1.06E-01 | 3.56E+00 | 7.12E-01 | 4.11E-01  | 2.65E-01 | 5.75E+00  | 3.05E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.55E+01 | 1.76E-02  | 3.75E-01 | 1.84E+00 | 5.46E-02 | 9.83E-01 | 1.06E-01 | 3.56E+00 | 7.12E-01 | 4.11E-01  | 2.65E-01 | 5.75E+00  | 3.05E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 1.51E+00 | 1.03E-03  | 7.00E-03 | 1.37E-01 | 4.90E-04 | 2.09E-03 | 7.65E-03 | 3.22E-02 | 1.75E-03 | 3.82E-02  | 2.88E-03 | 1.81E-01  | 5.08E-03 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.51E+00 | 1.03E-03  | 7.00E-03 | 1.37E-01 | 4.90E-04 | 2.09E-03 | 7.65E-03 | 3.22E-02 | 1.75E-03 | 3.82E-02  | 2.88E-03 | 1.81E-01  | 5.08E-03 |
| Alimentos + suelo + agua (mg/d) |                               | 1.70E+01 | 1.86E-02  | 3.82E-01 | 1.98E+00 | 5.51E-02 | 9.85E-01 | 1.14E-01 | 3.60E+00 | 7.14E-01 | 4.49E-01  | 2.68E-01 | 5.93E+00  | 3.11E-01 |
| PC ajustado (mg/kg/d)           |                               | 2.11E-01 | 2.31E-04  | 4.74E-03 | 2.45E-02 | 6.83E-04 | 1.22E-02 | 1.41E-03 | 4.46E-02 | 8.86E-03 | 5.57E-03  | 3.32E-03 | 7.35E-02  | 3.85E-03 |
| RH ajustado (mg/kg/d)           |                               | 2.11E-01 | 2.31E-04  | 4.74E-03 | 2.45E-02 | 6.83E-04 | 1.22E-02 | 1.41E-03 | 4.46E-02 | 8.86E-03 | 5.57E-03  | 3.32E-03 | 7.35E-02  | 3.85E-03 |
| Dosis diaria final (mg/kg/día)  |                               | 2.11E-01 | 2.31E-04  | 4.74E-03 | 2.45E-02 | 6.83E-04 | 1.22E-02 | 1.41E-03 | 4.46E-02 | 8.86E-03 | 5.57E-03  | 3.32E-03 | 7.35E-02  | 3.85E-03 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.09E-01 | 3.92E-03  | 4.56E-03 | 4.74E-04 | 8.87E-04 | 5.09E-03 | 1.92E-04 | 7.96E-03 | 1.88E-03 | 2.14E-02  | 2.32E-02 | 2.80E-04  | 9.26E-04 |

Parámetros del Modelo

|                                   |          |                                                                                                      |
|-----------------------------------|----------|------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 8.06E+01 | Cascelli de Azevedo y Murray 2007 (media de machos y hembras)                                        |
| Ingesta de alimentos (kg/d ph)    | 1.40E+00 | Emmons 1987 (en ph)                                                                                  |
| Ingesta de agua (L/d)             | 5.14E+00 | US EPA 1993 (CIA calculado: Peso corporal promedio utilizado (0.099 Peso^0.9) para machos y hembras) |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                                                      |
| Rango de hábitat (ha)             | 3.82E+03 | Cascelli de Azevedo y Murray 2007 (rango de hogar de machos y hembras utilizado conservadoramente)   |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                      |



Tabla 20 Tapir

| Tapir                           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 4.64E+04 | 3.24E+00  | 1.92E+00 | 3.69E+02 | 1.04E+00 | 7.41E+01 | 2.84E+00 | 7.34E+03 | 3.33E+00 | 2.45E+00  | 1.80E+01 | 1.32E+03  | 8.18E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 4.64E+04 | 3.24E+00  | 1.92E+00 | 3.69E+02 | 1.04E+00 | 7.41E+01 | 2.84E+00 | 7.34E+03 | 3.33E+00 | 2.45E+00  | 1.80E+01 | 1.32E+03  | 8.18E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.64E+04 | 3.24E+00  | 1.92E+00 | 3.69E+02 | 1.04E+00 | 7.41E+01 | 2.84E+00 | 7.34E+03 | 3.33E+00 | 2.45E+00  | 1.80E+01 | 1.32E+03  | 8.18E+00 |
| Dosis de suelo (mg/d)           |                               | 4.66E+03 | 1.49E+00  | 9.00E-01 | 9.95E+00 | 1.24E-01 | 1.13E+01 | 2.03E+00 | 1.74E+02 | 4.75E+00 | 6.01E-01  | 7.77E-01 | 9.59E-01  | 2.49E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.66E+03 | 1.49E+00  | 9.00E-01 | 9.95E+00 | 1.24E-01 | 1.13E+01 | 2.03E+00 | 1.74E+02 | 4.75E+00 | 6.01E-01  | 7.77E-01 | 9.59E-01  | 2.49E+01 |
| Dosis de agua (mg/d)            |                               | 4.18E+00 | 2.85E-03  | 1.94E-02 | 3.80E-01 | 1.36E-03 | 5.79E-03 | 2.12E-02 | 8.93E-02 | 4.84E-03 | 1.06E-01  | 7.98E-03 | 5.01E-01  | 1.41E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.18E+00 | 2.85E-03  | 1.94E-02 | 3.80E-01 | 1.36E-03 | 5.79E-03 | 2.12E-02 | 8.93E-02 | 4.84E-03 | 1.06E-01  | 7.98E-03 | 5.01E-01  | 1.41E-02 |
| Alimentos + suelo + agua (mg/d) |                               | 5.11E+04 | 4.73E+00  | 2.84E+00 | 3.79E+02 | 1.17E+00 | 8.54E+01 | 4.90E+00 | 7.52E+03 | 8.09E+00 | 3.16E+00  | 1.87E+01 | 1.32E+03  | 3.31E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.04E+02 | 1.89E-02  | 1.14E-02 | 1.52E+00 | 4.67E-03 | 3.42E-01 | 1.96E-02 | 3.01E+01 | 3.23E-02 | 1.26E-02  | 7.49E-02 | 5.28E+00  | 1.32E-01 |
| RH ajustado (mg/kg/d)           |                               | 2.04E+02 | 1.89E-02  | 1.14E-02 | 1.52E+00 | 4.67E-03 | 3.42E-01 | 1.96E-02 | 3.01E+01 | 3.23E-02 | 1.26E-02  | 7.49E-02 | 5.28E+00  | 1.32E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.04E+02 | 1.89E-02  | 1.14E-02 | 1.52E+00 | 4.67E-03 | 3.42E-01 | 1.96E-02 | 3.01E+01 | 3.23E-02 | 1.26E-02  | 7.49E-02 | 5.28E+00  | 1.32E-01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.06E+02 | 3.21E-01  | 1.09E-02 | 2.93E-02 | 6.07E-03 | 1.42E-01 | 2.67E-03 | 5.37E+00 | 6.88E-03 | 4.86E-02  | 5.24E-01 | 2.01E-02  | 3.18E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.50E+02 | Foerster et al. 2000 (estimado medio utilizado)                              |
| Ingesta de alimentos (kg/d ph)    | 2.07E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 1.42E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 1.48E-01 | Beyer et al. (1994) (2.3% para jabalí)                                       |
| Rango de hábitat (ha)             | 1.25E+02 | Foerster y Vaughan 2002 (promedio utilizado)                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |



Tabla 21 Mono Araña

| Mono Araña                      |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 4.98E+02 | 3.48E-02  | 2.06E-02 | 3.96E+00 | 1.12E-02 | 7.95E-01 | 3.05E-02 | 7.88E+01 | 3.57E-02 | 2.63E-02  | 1.93E-01 | 1.41E+01  | 8.18E+00 |
| 0.00                            | fruta                         | 7.62E+02 | 6.49E-02  | 1.96E-02 | 1.87E+01 | 2.29E-02 | 1.25E+00 | 2.97E-02 | 7.47E+01 | 8.65E-02 | 1.77E-01  | 6.34E-02 | 2.06E+01  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.26E+03 | 9.96E-02  | 4.02E-02 | 2.26E+01 | 3.40E-02 | 2.04E+00 | 6.02E-02 | 1.53E+02 | 1.22E-01 | 2.03E-01  | 2.56E-01 | 3.48E+01  | 2.70E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.26E+03 | 9.96E-02  | 4.02E-02 | 2.26E+01 | 3.40E-02 | 2.04E+00 | 6.02E-02 | 1.53E+02 | 1.22E-01 | 2.03E-01  | 2.56E-01 | 3.48E+01  | 2.70E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 1.34E-01 | 9.15E-05  | 6.22E-04 | 1.22E-02 | 4.36E-05 | 1.86E-04 | 6.80E-04 | 2.87E-03 | 1.56E-04 | 3.40E-03  | 2.56E-04 | 1.61E-02  | 4.52E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.34E-01 | 9.15E-05  | 6.22E-04 | 1.22E-02 | 4.36E-05 | 1.86E-04 | 6.80E-04 | 2.87E-03 | 1.56E-04 | 3.40E-03  | 2.56E-04 | 1.61E-02  | 4.52E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.26E+03 | 9.97E-02  | 4.08E-02 | 2.27E+01 | 3.41E-02 | 2.04E+00 | 6.09E-02 | 1.53E+02 | 1.22E-01 | 2.07E-01  | 2.56E-01 | 3.48E+01  | 2.70E-01 |
| PC ajustado (mg/kg/d)           |                               | 2.30E+02 | 1.82E-02  | 7.45E-03 | 4.14E+00 | 6.22E-03 | 3.72E-01 | 1.11E-02 | 2.80E+01 | 2.23E-02 | 3.77E-02  | 4.68E-02 | 6.35E+00  | 4.93E-02 |
| RH ajustado (mg/kg/d)           |                               | 2.30E+02 | 1.82E-02  | 7.45E-03 | 4.14E+00 | 6.22E-03 | 3.72E-01 | 1.11E-02 | 2.80E+01 | 2.23E-02 | 3.77E-02  | 4.68E-02 | 6.35E+00  | 4.93E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 2.30E+02 | 1.82E-02  | 7.45E-03 | 4.14E+00 | 6.22E-03 | 3.72E-01 | 1.11E-02 | 2.80E+01 | 2.23E-02 | 3.77E-02  | 4.68E-02 | 6.35E+00  | 4.93E-02 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.19E+02 | 3.08E-01  | 7.17E-03 | 7.98E-02 | 8.08E-03 | 1.55E-01 | 1.52E-03 | 5.00E+00 | 4.75E-03 | 1.45E-01  | 3.27E-01 | 2.41E-02  | 1.18E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 5.48E+00 | Clark.G. 1944 (media de 19 monos araña adultos)                              |
| Ingesta de alimentos (kg/d ph)    | 1.11E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 4.58E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                              |
| Rango de hábitat (ha)             | 2.76E+02 | Wallace 2008 (promedio de ámbitos de hogar presentado en la Tabla 1)         |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |



Tabla 22    Águila Crestada

| Águila Crestada                   |                               | Aluminio | Antimonio                                  | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|-----------------------------------|-------------------------------|----------|--------------------------------------------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                     | Dosis [mg/d]                  |          |                                            |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                              | gusanos                       | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                              | hojas                         | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                              | fruta                         | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                              | peces                         | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                              | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                              | mamíferos herbívoros pequeños | 3.37E-02 | 1.78E-06                                   | 1.45E-06 | 6.05E-05 | 3.34E-07 | 2.00E-04 | 2.17E-05 | 2.73E-02 | 6.53E-07 | 2.21E-05  | 6.84E-05 | 1.86E-04  | 1.20E-05 |
| 0.00                              | mamíferos pequeños            | 0.00E+00 | 3.76E-03                                   | 1.08E-03 | 6.45E-03 | 8.17E-03 | 1.75E-01 | 1.10E-02 | 6.68E-01 | 1.56E-01 | 0.00E+00  | 3.85E-02 | 0.00E+00  | 6.46E-02 |
| Dosis de alimentos (mg/d)         |                               | 3.37E-02 | 3.77E-03                                   | 1.08E-03 | 6.51E-03 | 8.17E-03 | 1.75E-01 | 1.11E-02 | 6.95E-01 | 1.56E-01 | 2.21E-05  | 3.85E-02 | 1.86E-04  | 6.47E-02 |
| x factor de biodisponibilidad     |                               | 1.00     | 1.00                                       | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                  |                               | 3.37E-02 | 3.77E-03                                   | 1.08E-03 | 6.51E-03 | 8.17E-03 | 1.75E-01 | 1.11E-02 | 6.95E-01 | 1.56E-01 | 2.21E-05  | 3.85E-02 | 1.86E-04  | 6.47E-02 |
| Dosis de suelo (mg/d)             |                               | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad     |                               | 1.00     | 1.00                                       | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                  |                               | 0.00E+00 | 0.00E+00                                   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)              |                               | 3.57E-02 | 2.44E-05                                   | 1.66E-04 | 3.25E-03 | 1.16E-05 | 4.95E-05 | 1.81E-04 | 7.63E-04 | 4.14E-05 | 9.05E-04  | 6.82E-05 | 4.28E-03  | 1.20E-04 |
| x factor de biodisponibilidad     |                               | 1.00     | 1.00                                       | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                  |                               | 3.57E-02 | 2.44E-05                                   | 1.66E-04 | 3.25E-03 | 1.16E-05 | 4.95E-05 | 1.81E-04 | 7.63E-04 | 4.14E-05 | 9.05E-04  | 6.82E-05 | 4.28E-03  | 1.20E-04 |
| Alimentos + suelo + agua (mg/d)   |                               | 6.94E-02 | 3.79E-03                                   | 1.24E-03 | 9.76E-03 | 8.18E-03 | 1.75E-01 | 1.12E-02 | 6.96E-01 | 1.56E-01 | 9.27E-04  | 3.86E-02 | 4.47E-03  | 6.48E-02 |
| PC ajustado (mg/kg/d)             |                               | 2.35E-02 | 1.28E-03                                   | 4.21E-04 | 3.31E-03 | 2.77E-03 | 5.94E-02 | 3.81E-03 | 2.36E-01 | 5.30E-02 | 3.14E-04  | 1.31E-02 | 1.52E-03  | 2.20E-02 |
| RH ajustado (mg/kg/d)             |                               | 2.35E-02 | 1.28E-03                                   | 4.21E-04 | 3.31E-03 | 2.77E-03 | 5.94E-02 | 3.81E-03 | 2.36E-01 | 5.30E-02 | 3.14E-04  | 1.31E-02 | 1.52E-03  | 2.20E-02 |
| Dosis diaria final (mg/kg/día)    |                               | 2.35E-02 | 1.28E-03                                   | 4.21E-04 | 3.31E-03 | 2.77E-03 | 5.94E-02 | 3.81E-03 | 2.36E-01 | 5.30E-02 | 3.14E-04  | 1.31E-02 | 1.52E-03  | 2.20E-02 |
| VRT ajustado (mg/kg/d)            |                               | 4.17E+00 | 0.00E+00                                   | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO               |                               | 5.64E-03 | NA                                         | 1.88E-04 | 1.59E-04 | 1.89E-03 | 2.23E-02 | 5.01E-04 | 5.82E-02 | 3.25E-02 | 8.97E-05  | 4.51E-02 | 5.68E-06  | 6.38E-02 |
| Parámetros del Modelo             |                               |          |                                            |          |          |          |          |          |          |          |           |          |           |          |
| Peso corporal (PC; kg)            |                               | 2.95E+00 | Kiff et al., 1989                          |          |          |          |          |          |          |          |           |          |           |          |
| Ingesta de alimentos (kg/d ph)    |                               | 1.95E-01 | US EPA 1993 - ecuación para todas las aves |          |          |          |          |          |          |          |           |          |           |          |
| Ingesta de agua (L/d)             |                               | 1.22E-01 | US EPA 1993 - ecuación para todas las aves |          |          |          |          |          |          |          |           |          |           |          |
| Ingesta de suelo/sedimento (kg/d) |                               | 0.00E+00 | US EPA 1993 (águila calva)                 |          |          |          |          |          |          |          |           |          |           |          |
| Rango de hábitat (ha)             |                               | 8.00E+02 | Robinson 1994                              |          |          |          |          |          |          |          |           |          |           |          |
| Factor de rango de hábitat (RH)   |                               | 1.00     |                                            |          |          |          |          |          |          |          |           |          |           |          |



Tabla 23    Martin Pescador Grande

| Martin Pescador Grande          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 1.73E+01 | 1.60E-03  | 4.22E-01 | 2.07E+00 | 2.21E-02 | 2.61E-01 | 6.64E-02 | 5.07E-01 | 4.45E-02 | 4.68E-01  | 1.12E-01 | 6.55E+00  | 3.09E-02 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.73E+01 | 1.60E-03  | 4.22E-01 | 2.07E+00 | 2.21E-02 | 2.61E-01 | 6.64E-02 | 5.07E-01 | 4.45E-02 | 4.68E-01  | 1.12E-01 | 6.55E+00  | 3.09E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.73E+01 | 1.60E-03  | 4.22E-01 | 2.07E+00 | 2.21E-02 | 2.61E-01 | 6.64E-02 | 5.07E-01 | 4.45E-02 | 4.68E-01  | 1.12E-01 | 6.55E+00  | 3.09E-02 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 9.99E-03 | 6.81E-06  | 4.63E-05 | 9.08E-04 | 3.25E-06 | 1.38E-05 | 5.06E-05 | 2.13E-04 | 1.16E-05 | 2.53E-04  | 1.91E-05 | 1.20E-03  | 3.36E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 9.99E-03 | 6.81E-06  | 4.63E-05 | 9.08E-04 | 3.25E-06 | 1.38E-05 | 5.06E-05 | 2.13E-04 | 1.16E-05 | 2.53E-04  | 1.91E-05 | 1.20E-03  | 3.36E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 1.73E+01 | 1.60E-03  | 4.22E-01 | 2.07E+00 | 2.21E-02 | 2.61E-01 | 6.65E-02 | 5.07E-01 | 4.45E-02 | 4.68E-01  | 1.12E-01 | 6.55E+00  | 3.09E-02 |
| PC ajustado (mg/kg/d)           |                               | 5.51E+01 | 5.09E-03  | 1.34E+00 | 6.56E+00 | 7.03E-02 | 8.28E-01 | 2.11E-01 | 1.61E+00 | 1.41E-01 | 1.49E+00  | 3.56E-01 | 2.08E+01  | 9.81E-02 |
| RH ajustado (mg/kg/d)           |                               | 5.51E+01 | 5.09E-03  | 1.34E+00 | 6.56E+00 | 7.03E-02 | 8.28E-01 | 2.11E-01 | 1.61E+00 | 1.41E-01 | 1.49E+00  | 3.56E-01 | 2.08E+01  | 9.81E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 5.51E+01 | 5.09E-03  | 1.34E+00 | 6.56E+00 | 7.03E-02 | 8.28E-01 | 2.11E-01 | 1.61E+00 | 1.41E-01 | 1.49E+00  | 3.56E-01 | 2.08E+01  | 9.81E-02 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1.32E+01 | NA        | 5.98E-01 | 3.16E-01 | 4.78E-02 | 3.11E-01 | 2.77E-02 | 3.98E-01 | 8.67E-02 | 4.25E-01  | 1.23E+00 | 7.79E-02  | 2.85E-01 |

Parámetros del Modelo

|                                   |          |                                                                                                         |
|-----------------------------------|----------|---------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.15E-01 | Wildbirds Unlimited, 2009                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.60E-01 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de agua (L/d)             | 3.41E-02 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Rango de hábitat (ha)             | 3.90E-01 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                         |





Tabla 24 Armadillo

| Armadillo                       |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 7.92E+03 | 3.01E+00  | 7.34E-01 | 3.44E+01 | 9.33E-01 | 1.17E+01 | 4.35E+00 | 4.80E+01 | 8.15E+01 | 3.22E-01  | 6.32E+00 | 1.81E+01  | 2.77E+01 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 7.92E+03 | 3.01E+00  | 7.34E-01 | 3.44E+01 | 9.33E-01 | 1.17E+01 | 4.35E+00 | 4.80E+01 | 8.15E+01 | 3.22E-01  | 6.32E+00 | 1.81E+01  | 2.77E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 7.92E+03 | 3.01E+00  | 7.34E-01 | 3.44E+01 | 9.33E-01 | 1.17E+01 | 4.35E+00 | 4.80E+01 | 8.15E+01 | 3.22E-01  | 6.32E+00 | 1.81E+01  | 2.77E+01 |
| Dosis de suelo (mg/d)           |                               | 1.61E+03 | 5.12E-01  | 3.11E-01 | 3.43E+00 | 4.27E-02 | 3.90E+00 | 7.02E-01 | 5.99E+01 | 1.64E+00 | 2.07E-01  | 2.68E-01 | 3.31E-01  | 8.58E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.61E+03 | 5.12E-01  | 3.11E-01 | 3.43E+00 | 4.27E-02 | 3.90E+00 | 7.02E-01 | 5.99E+01 | 1.64E+00 | 2.07E-01  | 2.68E-01 | 3.31E-01  | 8.58E+00 |
| Dosis de agua (mg/d)            |                               | 1.47E-01 | 1.00E-04  | 6.80E-04 | 1.33E-02 | 4.77E-05 | 2.03E-04 | 7.43E-04 | 3.13E-03 | 1.70E-04 | 3.71E-03  | 2.80E-04 | 1.76E-02  | 4.93E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.47E-01 | 1.00E-04  | 6.80E-04 | 1.33E-02 | 4.77E-05 | 2.03E-04 | 7.43E-04 | 3.13E-03 | 1.70E-04 | 3.71E-03  | 2.80E-04 | 1.76E-02  | 4.93E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 9.53E+03 | 3.53E+00  | 1.05E+00 | 3.79E+01 | 9.76E-01 | 1.56E+01 | 5.06E+00 | 1.08E+02 | 8.32E+01 | 5.33E-01  | 6.59E+00 | 1.85E+01  | 3.63E+01 |
| PC ajustado (mg/kg/d)           |                               | 1.59E+03 | 5.88E-01  | 1.74E-01 | 6.31E+00 | 1.63E-01 | 2.60E+00 | 8.43E-01 | 1.80E+01 | 1.39E+01 | 8.88E-02  | 1.10E+00 | 3.08E+00  | 6.05E+00 |
| RH ajustado (mg/kg/d)           |                               | 1.59E+03 | 5.88E-01  | 1.74E-01 | 6.31E+00 | 1.63E-01 | 2.60E+00 | 8.43E-01 | 1.80E+01 | 1.39E+01 | 8.88E-02  | 1.10E+00 | 3.08E+00  | 6.05E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 1.59E+03 | 5.88E-01  | 1.74E-01 | 6.31E+00 | 1.63E-01 | 2.60E+00 | 8.43E-01 | 1.80E+01 | 1.39E+01 | 8.88E-02  | 1.10E+00 | 3.08E+00  | 6.05E+00 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 8.23E+02 | 9.96E+00  | 1.68E-01 | 1.22E-01 | 2.11E-01 | 1.08E+00 | 1.15E-01 | 3.21E+00 | 2.95E+00 | 3.41E-01  | 7.68E+00 | 1.17E-02  | 1.45E+00 |

Parámetros del Modelo

|                                   |          |                                                      |
|-----------------------------------|----------|------------------------------------------------------|
| Peso corporal (PC; kg)            | 6.00E+00 | Frappell et al. 1998                                 |
| Ingesta de alimentos (kg/d ph)    | 1.25E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de agua (L/d)             | 5.00E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de suelo/sedimento (kg/d) | 5.10E-02 | Beyer et al., 1994 (17% del CIA)                     |
| Rango de hábitat (ha)             | 1.00E+01 | Loughry et al., 1997                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                      |



Tabla 25 Loro Cabeciazul

| Loro Cabeciazul                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | Gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | Hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | Fruta                         | 9.33E+01 | 7.95E-03  | 2.40E-03 | 2.29E+00 | 2.80E-03 | 1.53E-01 | 3.64E-03 | 9.15E+00 | 1.06E-02 | 2.17E-02  | 7.76E-03 | 2.53E+00  | 2.23E-02 |
| 0.00                            | Peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | Mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | Mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | Mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 9.33E+01 | 7.95E-03  | 2.40E-03 | 2.29E+00 | 2.80E-03 | 1.53E-01 | 3.64E-03 | 9.15E+00 | 1.06E-02 | 2.17E-02  | 7.76E-03 | 2.53E+00  | 2.23E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 9.33E+01 | 7.95E-03  | 2.40E-03 | 2.29E+00 | 2.80E-03 | 1.53E-01 | 3.64E-03 | 9.15E+00 | 1.06E-02 | 2.17E-02  | 7.76E-03 | 2.53E+00  | 2.23E-02 |
| Dosis de suelo (mg/d)           |                               | 8.25E+01 | 2.63E-02  | 1.59E-02 | 1.76E-01 | 2.19E-03 | 2.00E-01 | 3.60E-02 | 3.07E+00 | 8.42E-02 | 1.06E-02  | 1.38E-02 | 1.70E-02  | 4.41E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 8.25E+01 | 2.63E-02  | 1.59E-02 | 1.76E-01 | 2.19E-03 | 2.00E-01 | 3.60E-02 | 3.07E+00 | 8.42E-02 | 1.06E-02  | 1.38E-02 | 1.70E-02  | 4.41E-01 |
| Dosis de agua (mg/d)            |                               | 7.60E-03 | 5.18E-06  | 3.53E-05 | 6.91E-04 | 2.47E-06 | 1.05E-05 | 3.85E-05 | 1.62E-04 | 8.81E-06 | 1.93E-04  | 1.45E-05 | 9.12E-04  | 2.56E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 7.60E-03 | 5.18E-06  | 3.53E-05 | 6.91E-04 | 2.47E-06 | 1.05E-05 | 3.85E-05 | 1.62E-04 | 8.81E-06 | 1.93E-04  | 1.45E-05 | 9.12E-04  | 2.56E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 1.76E+02 | 3.42E-02  | 1.84E-02 | 2.47E+00 | 5.00E-03 | 3.53E-01 | 3.97E-02 | 1.22E+01 | 9.48E-02 | 3.25E-02  | 2.15E-02 | 2.55E+00  | 4.63E-01 |
| PC ajustado (mg/kg/d)           |                               | 6.00E+02 | 1.17E-01  | 6.27E-02 | 8.42E+00 | 1.70E-02 | 1.20E+00 | 1.35E-01 | 4.17E+01 | 3.23E-01 | 1.11E-01  | 7.35E-02 | 8.70E+00  | 1.58E+00 |
| RH ajustado (mg/kg/d)           |                               | 6.00E+02 | 1.17E-01  | 6.27E-02 | 8.42E+00 | 1.70E-02 | 1.20E+00 | 1.35E-01 | 4.17E+01 | 3.23E-01 | 1.11E-01  | 7.35E-02 | 8.70E+00  | 1.58E+00 |
| CS ajustada (mg/kg/d)           |                               | 6.00E+02 | 1.17E-01  | 6.27E-02 | 8.42E+00 | 1.70E-02 | 1.20E+00 | 1.35E-01 | 4.17E+01 | 3.23E-01 | 1.11E-01  | 7.35E-02 | 8.70E+00  | 1.58E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 6.00E+02 | 1.17E-01  | 6.27E-02 | 8.42E+00 | 1.70E-02 | 1.20E+00 | 1.35E-01 | 4.17E+01 | 3.23E-01 | 1.11E-01  | 7.35E-02 | 8.70E+00  | 1.58E+00 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 144.0    | NA        | 2.80E-02 | 0.4      | 1.16E-02 | 0.5      | 1.78E-02 | 10.3     | 0.2      | 3.17E-02  | 0.3      | 3.26E-02  | 4.6      |

Parámetros del Modelo

|                                   |          |                                                                                                    |
|-----------------------------------|----------|----------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.93E-01 | Gilardi y Munn, 1988                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.09E-01 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de agua (L/d)             | 2.59E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de suelo/sedimento (kg/d) | 2.62E-03 | Se asume que sea el 10% del CIA debido a las marcas dejadas por las aves en las paredes de arcilla |
| Rango de hábitat (ha)             | 1.67E+01 | Robinson et al. 2000                                                                               |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                    |
| Factor de cubierta de suelo (CS)  | 1.00     |                                                                                                    |





Tabla 26    Zorzalito de Swainson

| Zorzalito de Swainson           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 1.59E+02 | 6.07E-02  | 1.48E-02 | 6.93E-01 | 1.88E-02 | 2.35E-01 | 8.77E-02 | 9.67E-01 | 1.64E+00 | 6.48E-03  | 1.27E-01 | 3.65E-01  | 5.58E-01 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.59E+02 | 6.07E-02  | 1.48E-02 | 6.93E-01 | 1.88E-02 | 2.35E-01 | 8.77E-02 | 9.67E-01 | 1.64E+00 | 6.48E-03  | 1.27E-01 | 3.65E-01  | 5.58E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.59E+02 | 6.07E-02  | 1.48E-02 | 6.93E-01 | 1.88E-02 | 2.35E-01 | 8.77E-02 | 9.67E-01 | 1.64E+00 | 6.48E-03  | 1.27E-01 | 3.65E-01  | 5.58E-01 |
| Dosis de suelo (mg/d)           |                               | 3.96E+00 | 1.26E-03  | 7.65E-04 | 8.45E-03 | 1.05E-04 | 9.61E-03 | 1.73E-03 | 1.48E-01 | 4.04E-03 | 5.10E-04  | 6.60E-04 | 8.15E-04  | 2.11E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.96E+00 | 1.26E-03  | 7.65E-04 | 8.45E-03 | 1.05E-04 | 9.61E-03 | 1.73E-03 | 1.48E-01 | 4.04E-03 | 5.10E-04  | 6.60E-04 | 8.15E-04  | 2.11E-02 |
| Dosis de agua (mg/d)            |                               | 1.68E-03 | 1.15E-06  | 7.79E-06 | 1.53E-04 | 5.46E-07 | 2.33E-06 | 8.52E-06 | 3.59E-05 | 1.95E-06 | 4.26E-05  | 3.21E-06 | 2.02E-04  | 5.65E-06 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.68E-03 | 1.15E-06  | 7.79E-06 | 1.53E-04 | 5.46E-07 | 2.33E-06 | 8.52E-06 | 3.59E-05 | 1.95E-06 | 4.26E-05  | 3.21E-06 | 2.02E-04  | 5.65E-06 |
| Alimentos + suelo + agua (mg/d) |                               | 1.63E+02 | 6.19E-02  | 1.56E-02 | 7.02E-01 | 1.89E-02 | 2.45E-01 | 8.94E-02 | 1.11E+00 | 1.65E+00 | 7.03E-03  | 1.28E-01 | 3.66E-01  | 5.79E-01 |
| PC ajustado (mg/kg/d)           |                               | 5.30E+03 | 2.01E+00  | 5.05E-01 | 2.28E+01 | 6.13E-01 | 7.95E+00 | 2.90E+00 | 3.62E+01 | 5.34E+01 | 2.28E-01  | 4.15E+00 | 1.19E+01  | 1.88E+01 |
| RH ajustado (mg/kg/d)           |                               | 5.30E+03 | 2.01E+00  | 5.05E-01 | 2.28E+01 | 6.13E-01 | 7.95E+00 | 2.90E+00 | 3.62E+01 | 5.34E+01 | 2.28E-01  | 4.15E+00 | 1.19E+01  | 1.88E+01 |
| CS ajustada (mg/kg/d)           |                               | 5.30E+03 | 2.01E+00  | 5.05E-01 | 2.28E+01 | 6.13E-01 | 7.95E+00 | 2.90E+00 | 3.62E+01 | 5.34E+01 | 2.28E-01  | 4.15E+00 | 1.19E+01  | 1.88E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 5.30E+03 | 2.01E+00  | 5.05E-01 | 2.28E+01 | 6.13E-01 | 7.95E+00 | 2.90E+00 | 3.62E+01 | 5.34E+01 | 2.28E-01  | 4.15E+00 | 1.19E+01  | 1.88E+01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1271.8   | NA        | 0.2      | 1.1      | 0.4      | 3.0      | 0.4      | 8.9      | 32.8     | 0.1       | 14.3     | 4.45E-02  | 54.7     |

Parámetros del Modelo

|                                   |          |                                                                |
|-----------------------------------|----------|----------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.08E-02 | Dunning 1984 (valor medio utilizado)                           |
| Ingesta de alimentos (kg/d ph)    | 2.52E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de agua (L/d)             | 5.73E-03 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 1.26E-04 | Sample y Suter, 1994; ingesta de suelo del petirrojo americano |
| Rango de hábitat (ha)             | 4.20E-01 | Sample y Suter, 1994; Rango de hábitat del petirrojo americano |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                |



**Tabla 27**      **Página De Resumen**

|                        |                                          |           |               |         |                                           |           |                                        |        |         |                                                                                     |         |           |         |
|------------------------|------------------------------------------|-----------|---------------|---------|-------------------------------------------|-----------|----------------------------------------|--------|---------|-------------------------------------------------------------------------------------|---------|-----------|---------|
| Nombre del Proyecto    | Mina Petaquilla                          |           |               |         |                                           | Archivos: | (1) Página de Resumen                  |        |         |  |         |           |         |
| Número de Proyecto     | 07-1334-0018                             |           | Creado por:   | LSC     |                                           |           | (2) Concentraciones Ambientales        |        |         |                                                                                     |         |           |         |
| Fecha:                 | 10 de Junio de 2010                      |           | Revisado por: | ADB     |                                           |           | (3) Modelos de Absorción               |        |         |                                                                                     |         |           |         |
| Notas:                 | Línea base - Estimado de Límite Superior |           |               |         |                                           |           | (4) Valores de Referencia de Toxicidad |        |         |                                                                                     |         |           |         |
|                        |                                          |           |               |         |                                           |           | (5) Cálculos del Rango de Hábitat      |        |         |                                                                                     |         |           |         |
|                        |                                          |           |               |         | (6) Páginas de Cálculo Para Cada Receptor |           |                                        |        |         |                                                                                     |         |           |         |
|                        | Aluminio                                 | Antimonio | Arsénico      | Bario   | Cadmio                                    | Cromo     | Cobalto                                | Cobre  | Plomo   | Molibdeno                                                                           | Selenio | Estroncio | Vanadio |
| jaguar                 | 0.1775                                   | 0.0123    | 0.0030        | 0.0006  | 0.0010                                    | 0.0110    | 0.0003                                 | 0.0070 | 0.0020  | 0.0017                                                                              | 0.0224  | 0.0004    | 0.0022  |
| tapir                  | 146.26                                   | 0.32      | 0.01          | 0.04    | 0.01                                      | 0.46      | 0.01                                   | 2.76   | 0.01    | 0.47                                                                                | 0.41    | 0.03      | 0.07    |
| mono araña             | 164.50                                   | 0.31      | 3.6E-03       | 0.16    | 0.01                                      | 0.50      | 2.8E-03                                | 2.43   | 3.3E-03 | 1.44                                                                                | 0.22    | 0.04      | 0.02    |
| águila crestada        | 0.01                                     | NA        | 1.6E-04       | 6.6E-04 | 2.1E-03                                   | 0.05      | 1.2E-03                                | 0.05   | 0.03    | 2.8E-05                                                                             | 0.04    | 7.2E-06   | 0.14    |
| martín pescador grande | 20.12                                    | NA        | 0.40          | 0.40    | 0.05                                      | 0.46      | 0.02                                   | 0.32   | 0.18    | 0.03                                                                                | 1.22    | 0.12      | 0.93    |
| armadillo              | 1136.43                                  | 9.92      | 0.14          | 0.18    | 0.26                                      | 2.48      | 0.23                                   | 2.41   | 2.75    | 3.45                                                                                | 6.43    | 0.02      | 3.30    |
| loro cabeciazul        | 198.77                                   | NA        | 0.02          | 0.86    | 0.01                                      | 1.46      | 0.03                                   | 4.93   | 0.18    | 0.32                                                                                | 0.17    | 0.05      | 10.22   |
| zorzalito de swainson  | 1756.97                                  | NA        | 0.19          | 1.54    | 0.51                                      | 6.05      | 0.76                                   | 8.53   | 30.57   | 0.66                                                                                | 11.99   | 0.07      | 124.10  |

Tabla 28    Concentraciones Ambientales

|                               |                      | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  | Porcentaje de Humedad |
|-------------------------------|----------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|-----------------------|
| Ítem                          | Unidades             |          |           |          |          |          |          |          |          |          |           |          |           |          |                       |
| suelo                         | mg/kg de peso seco   | 4.36E+04 | 1.00E+01  | 5.00E+00 | 1.42E+02 | 1.03E+00 | 2.49E+02 | 2.73E+01 | 6.31E+02 | 3.00E+01 | 4.13E+01  | 4.40E+00 | 1.07E+01  | 3.82E+02 |                       |
| agua                          | mg/L                 | 7.94E-01 | 1.00E-03  | 1.00E-03 | 2.16E-02 | 2.00E-04 | 1.00E-03 | 1.00E-03 | 1.20E-02 | 1.00E-03 | 6.00E-04  | 1.00E-03 | 4.41E-02  | 2.00E-03 |                       |
| gusanos                       | mg/kg de peso húmedo | 8.75E+03 | 2.40E+00  | 4.82E-01 | 3.86E+01 | 9.15E-01 | 1.84E+01 | 6.91E+00 | 3.91E+01 | 6.08E+01 | 2.62E+00  | 4.23E+00 | 2.39E+01  | 5.03E+01 | 0.76                  |
| hojas                         | mg/kg de peso húmedo | 3.09E+03 | 1.55E-01  | 6.20E-02 | 2.61E+01 | 5.41E-02 | 1.15E+01 | 2.62E-01 | 1.82E+02 | 1.16E-01 | 1.19E+00  | 6.82E-01 | 1.05E+02  | 6.51E-01 | 0.69                  |
| fruta                         | mg/kg de peso húmedo | 1.18E+03 | 7.20E-02  | 7.20E-03 | 4.44E+01 | 2.56E-02 | 4.45E+00 | 5.89E-02 | 3.85E+01 | 6.48E-02 | 2.01E+00  | 2.64E-02 | 3.82E+01  | 2.75E-01 | 0.76                  |
| peces                         | mg/kg de peso húmedo | 1.65E+02 | 2.00E-02  | 1.75E+00 | 1.65E+01 | 1.58E-01 | 2.41E+00 | 2.46E-01 | 2.52E+00 | 5.91E-01 | 2.24E-01  | 6.97E-01 | 6.20E+01  | 6.32E-01 | 0.75                  |
| mamíferos herbívoros grandes  | mg/kg de peso húmedo | 4.23E-01 | 1.88E-05  | 1.63E-05 | 3.38E-04 | 2.81E-06 | 6.04E-03 | 7.59E-04 | 1.55E-01 | 8.23E-06 | 7.39E-04  | 8.88E-04 | 2.61E-03  | 7.00E-04 | 0.68                  |
| mamíferos herbívoros pequeños | mg/kg de peso húmedo | 4.76E-01 | 1.81E-05  | 7.54E-06 | 1.24E-03 | 3.51E-06 | 6.54E-03 | 4.06E-04 | 1.36E-01 | 4.60E-06 | 2.25E-03  | 4.81E-04 | 3.14E-03  | 1.78E-04 | 0.68                  |
| mamíferos pequeños            | mg/kg de peso húmedo |          | 1.20E-01  | 9.38E-03 | 3.86E-01 | 9.22E-02 | 4.25E+00 | 2.77E-01 | 6.26E+00 | 1.55E+00 |           | 3.69E-01 |           | 1.50E+00 | 0.68                  |

Notas: La concentración en mamíferos herbívoros grandes se calcula a partir de la dosis diaria final del tapir \* BTF (ORNL 1984).  
La concentración en mamíferos herbívoros pequeños se calcula a partir de la dosis diaria final del mono araña \* BTF (ORNL 1984).

Tabla 29 Tipo de Modelos de Absorción

|       |   |                               | Aluminio     | Antimonio    | Arsénico     | Bario        | Cadmio       | Cromo        | Cobalto      | Cobre        | Plomo        | Molibdeno    | Selenio      | Estroncio    | Vanadio      |
|-------|---|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Medio | a | Ítem                          |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Suelo | a | gusanos                       | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | hojas                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | fruta                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | peces                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | mamíferos herbívoros grandes  | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos herbívoros pequeños | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos pequeños            |              | BAF-ECO      | LR-ECO       | BAF-ECO      | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       |              | LR-ECO       |              | BAF-ECO      |

**LEYENDA:** **BTF-ORNL** Factor de transferencia de la carne de vacuno a partir de los informes del Oak Ridge National Laboratory  
**LR-ORNL** Regresión lineal a partir de los informes del Oak Ridge National Laboratory  
**BAF-ORNL** Factor de bioacumulación a partir de los informes del Oak Ridge National Laboratory  
**BAF-ECO** Factor de bioacumulación de ECO-SSL  
**Pronosticado** Los datos fueron pronosticados a partir de los datos del área del estudio de línea base  
**BTF-EPA** Factor de transferencia de carne de vacuno de US EPA 1999

Tabla 30 Valor de Referencia de Toxicidad

|                        |          | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|------------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| Receptor               | PC [kg]  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| jaguar                 | 8.06E+01 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| tapir                  | 2.50E+02 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| mono araña             | 5.48E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| águila crestada        | 2.95E+00 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| martín pescador grande | 3.15E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| armadillo              | 6.00E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| loro cabeciazul        | 2.93E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| zorzalito de swainson  | 3.08E-02 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |

Nota: Se utilizó valores NOAEL para todos los receptores.

Tabla 31 Cálculos del Rango de Hábitat

| Receptor                 | Rango de Hábitat (ha) | Factor de Rango de Hábitat |
|--------------------------|-----------------------|----------------------------|
| jaguar                   | 3.82E+03              | 1.00                       |
| tapir                    | 1.25E+02              | 1.00                       |
| mono araña               | 2.76E+02              | 1.00                       |
| águila crestada          | 8.00E+02              | 1.00                       |
| martín pescador grande   | 3.90E-01              | 1.00                       |
| armadillo                | 1.00E+01              | 1.00                       |
| loro cabeciazul          | 1.67E+01              | 1.00                       |
| zorzalito de swainson    | 4.20E-01              | 1.00                       |
| Huella del Proyecto (ha) | 41,351                |                            |

Tabla 32 Jaguar

| Jaguar                          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.10                            | peces                         | 2.32E+01 | 2.80E-03  | 2.45E-01 | 2.30E+00 | 2.21E-02 | 3.37E-01 | 3.44E-02 | 3.53E-01 | 8.27E-02 | 3.14E-02  | 9.75E-02 | 8.67E+00  | 8.85E-02 |
| 0.30                            | mamíferos herbívoros grandes  | 1.78E-01 | 7.91E-06  | 6.85E-06 | 1.42E-04 | 1.18E-06 | 2.54E-03 | 3.19E-04 | 6.49E-02 | 3.46E-06 | 3.11E-04  | 3.73E-04 | 1.09E-03  | 2.94E-04 |
| 0.30                            | mamíferos herbívoros pequeños | 2.00E-01 | 7.59E-06  | 3.17E-06 | 5.22E-04 | 1.47E-06 | 2.75E-03 | 1.71E-04 | 5.73E-02 | 1.93E-06 | 9.46E-04  | 2.02E-04 | 1.32E-03  | 7.49E-05 |
| 0.30                            | mamíferos pequeños            | 0.00E+00 | 5.04E-02  | 3.94E-03 | 1.62E-01 | 3.87E-02 | 1.79E+00 | 1.16E-01 | 2.63E+00 | 6.53E-01 | 0.00E+00  | 1.55E-01 | 0.00E+00  | 6.32E-01 |
| Dosis de alimentos (mg/d)       |                               | 2.35E+01 | 5.32E-02  | 2.49E-01 | 2.47E+00 | 6.08E-02 | 2.13E+00 | 1.51E-01 | 3.10E+00 | 7.35E-01 | 3.27E-02  | 2.53E-01 | 8.68E+00  | 7.21E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.35E+01 | 5.32E-02  | 2.49E-01 | 2.47E+00 | 6.08E-02 | 2.13E+00 | 1.51E-01 | 3.10E+00 | 7.35E-01 | 3.27E-02  | 2.53E-01 | 8.68E+00  | 7.21E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 4.08E+00 | 5.14E-03  | 5.14E-03 | 1.11E-01 | 1.03E-03 | 5.14E-03 | 5.14E-03 | 6.17E-02 | 5.14E-03 | 3.09E-03  | 5.14E-03 | 2.27E-01  | 1.03E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.08E+00 | 5.14E-03  | 5.14E-03 | 1.11E-01 | 1.03E-03 | 5.14E-03 | 5.14E-03 | 6.17E-02 | 5.14E-03 | 3.09E-03  | 5.14E-03 | 2.27E-01  | 1.03E-02 |
| Alimentos + suelo + agua (mg/d) |                               | 2.76E+01 | 5.84E-02  | 2.54E-01 | 2.58E+00 | 6.18E-02 | 2.13E+00 | 1.56E-01 | 3.16E+00 | 7.40E-01 | 3.58E-02  | 2.58E-01 | 8.90E+00  | 7.31E-01 |
| PC ajustado (mg/kg/d)           |                               | 3.43E-01 | 7.24E-04  | 3.15E-03 | 3.20E-02 | 7.67E-04 | 2.65E-02 | 1.94E-03 | 3.93E-02 | 9.19E-03 | 4.44E-04  | 3.20E-03 | 1.10E-01  | 9.07E-03 |
| RH ajustado (mg/kg/d)           |                               | 3.43E-01 | 7.24E-04  | 3.15E-03 | 3.20E-02 | 7.67E-04 | 2.65E-02 | 1.94E-03 | 3.93E-02 | 9.19E-03 | 4.44E-04  | 3.20E-03 | 1.10E-01  | 9.07E-03 |
| Dosis diaria final (mg/kg/día)  |                               | 3.43E-01 | 7.24E-04  | 3.15E-03 | 3.20E-02 | 7.67E-04 | 2.65E-02 | 1.94E-03 | 3.93E-02 | 9.19E-03 | 4.44E-04  | 3.20E-03 | 1.10E-01  | 9.07E-03 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.78E-01 | 1.23E-02  | 3.03E-03 | 6.17E-04 | 9.96E-04 | 1.10E-02 | 2.65E-04 | 7.01E-03 | 1.95E-03 | 1.71E-03  | 2.24E-02 | 4.20E-04  | 2.18E-03 |

Parámetros del Modelo

|                                   |          |                                                                                                      |
|-----------------------------------|----------|------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 8.06E+01 | Cascelli de Azevedo y Murray 2007 (media de machos y hembras)                                        |
| Ingesta de alimentos (kg/d ph)    | 1.40E+00 | Emmons 1987 (en ph)                                                                                  |
| Ingesta de agua (L/d)             | 5.14E+00 | US EPA 1993 (CIA calculado: Peso corporal promedio utilizado (0.099 Peso^0.9) para machos y hembras) |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                                                      |
| Rango de hábitat (ha)             | 3.82E+03 | Cascelli de Azevedo y Murray 2007 (rango de hogar de machos y hembras utilizado conservadoramente)   |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                      |



Tabla 33 Tapir

| Tapir                           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 6.41E+04 | 3.21E+00  | 1.29E+00 | 5.42E+02 | 1.12E+00 | 2.38E+02 | 5.44E+00 | 3.77E+03 | 2.41E+00 | 2.47E+01  | 1.41E+01 | 2.17E+03  | 1.35E+01 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 6.41E+04 | 3.21E+00  | 1.29E+00 | 5.42E+02 | 1.12E+00 | 2.38E+02 | 5.44E+00 | 3.77E+03 | 2.41E+00 | 2.47E+01  | 1.41E+01 | 2.17E+03  | 1.35E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.41E+04 | 3.21E+00  | 1.29E+00 | 5.42E+02 | 1.12E+00 | 2.38E+02 | 5.44E+00 | 3.77E+03 | 2.41E+00 | 2.47E+01  | 1.41E+01 | 2.17E+03  | 1.35E+01 |
| Dosis de suelo (mg/d)           |                               | 6.44E+03 | 1.48E+00  | 7.39E-01 | 2.11E+01 | 1.52E-01 | 3.67E+01 | 4.03E+00 | 9.33E+01 | 4.44E+00 | 6.11E+00  | 6.50E-01 | 1.58E+00  | 5.65E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.44E+03 | 1.48E+00  | 7.39E-01 | 2.11E+01 | 1.52E-01 | 3.67E+01 | 4.03E+00 | 9.33E+01 | 4.44E+00 | 6.11E+00  | 6.50E-01 | 1.58E+00  | 5.65E+01 |
| Dosis de agua (mg/d)            |                               | 1.13E+01 | 1.42E-02  | 1.42E-02 | 3.07E-01 | 2.85E-03 | 1.42E-02 | 1.42E-02 | 1.71E-01 | 1.42E-02 | 8.55E-03  | 1.42E-02 | 6.28E-01  | 2.85E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.13E+01 | 1.42E-02  | 1.42E-02 | 3.07E-01 | 2.85E-03 | 1.42E-02 | 1.42E-02 | 1.71E-01 | 1.42E-02 | 8.55E-03  | 1.42E-02 | 6.28E-01  | 2.85E-02 |
| Alimentos + suelo + agua (mg/d) |                               | 7.06E+04 | 4.71E+00  | 2.04E+00 | 5.63E+02 | 1.28E+00 | 2.75E+02 | 9.49E+00 | 3.86E+03 | 6.86E+00 | 3.08E+01  | 1.48E+01 | 2.17E+03  | 7.00E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.82E+02 | 1.88E-02  | 8.16E-03 | 2.25E+00 | 5.11E-03 | 1.10E+00 | 3.79E-02 | 1.55E+01 | 2.74E-02 | 1.23E-01  | 5.92E-02 | 8.69E+00  | 2.80E-01 |
| RH ajustado (mg/kg/d)           |                               | 2.82E+02 | 1.88E-02  | 8.16E-03 | 2.25E+00 | 5.11E-03 | 1.10E+00 | 3.79E-02 | 1.55E+01 | 2.74E-02 | 1.23E-01  | 5.92E-02 | 8.69E+00  | 2.80E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.82E+02 | 1.88E-02  | 8.16E-03 | 2.25E+00 | 5.11E-03 | 1.10E+00 | 3.79E-02 | 1.55E+01 | 2.74E-02 | 1.23E-01  | 5.92E-02 | 8.69E+00  | 2.80E-01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.46E+02 | 3.19E-01  | 7.84E-03 | 4.35E-02 | 6.63E-03 | 4.58E-01 | 5.18E-03 | 2.76E+00 | 5.84E-03 | 4.74E-01  | 4.14E-01 | 3.30E-02  | 6.73E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.50E+02 | Foerster et al. 2000 (estimado medio utilizado)                              |
| Ingesta de alimentos (kg/d ph)    | 2.07E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 1.42E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 1.48E-01 | Beyer et al. (1994) (2.3% para jabalí)                                       |
| Rango de hábitat (ha)             | 1.25E+02 | Foerster y Vaughan 2002 (promedio utilizado)                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |





Tabla 34 Mono Araña

| Mono Araña                      |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [g/d]                   |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 6.88E+02 | 3.45E-02  | 1.38E-02 | 5.81E+00 | 1.20E-02 | 2.55E+00 | 5.84E-02 | 4.05E+01 | 2.59E-02 | 2.65E-01  | 1.52E-01 | 2.33E+01  | 1.45E-01 |
| 0.00                            | fruta                         | 1.05E+03 | 6.41E-02  | 6.41E-03 | 3.95E+01 | 2.28E-02 | 3.96E+00 | 5.25E-02 | 3.43E+01 | 5.77E-02 | 1.79E+00  | 2.35E-02 | 3.40E+01  | 2.45E-01 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.74E+03 | 9.86E-02  | 2.02E-02 | 4.54E+01 | 3.49E-02 | 6.51E+00 | 1.11E-01 | 7.47E+01 | 8.35E-02 | 2.06E+00  | 1.75E-01 | 5.73E+01  | 3.90E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.74E+03 | 9.86E-02  | 2.02E-02 | 4.54E+01 | 3.49E-02 | 6.51E+00 | 1.11E-01 | 7.47E+01 | 8.35E-02 | 2.06E+00  | 1.75E-01 | 5.73E+01  | 3.90E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 3.63E-01 | 4.58E-04  | 4.58E-04 | 9.86E-03 | 9.15E-05 | 4.58E-04 | 4.58E-04 | 5.49E-03 | 4.58E-04 | 2.75E-04  | 4.58E-04 | 2.02E-02  | 9.15E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.63E-01 | 4.58E-04  | 4.58E-04 | 9.86E-03 | 9.15E-05 | 4.58E-04 | 4.58E-04 | 5.49E-03 | 4.58E-04 | 2.75E-04  | 4.58E-04 | 2.02E-02  | 9.15E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.74E+03 | 9.90E-02  | 2.07E-02 | 4.54E+01 | 3.49E-02 | 6.51E+00 | 1.11E-01 | 7.47E+01 | 8.40E-02 | 2.06E+00  | 1.76E-01 | 5.73E+01  | 3.91E-01 |
| PC ajustado (mg/kg/d)           |                               | 3.17E+02 | 1.81E-02  | 3.77E-03 | 8.28E+00 | 6.38E-03 | 1.19E+00 | 2.03E-02 | 1.36E+01 | 1.53E-02 | 3.75E-01  | 3.21E-02 | 1.05E+01  | 7.13E-02 |
| RH ajustado (mg/kg/d)           |                               | 3.17E+02 | 1.81E-02  | 3.77E-03 | 8.28E+00 | 6.38E-03 | 1.19E+00 | 2.03E-02 | 1.36E+01 | 1.53E-02 | 3.75E-01  | 3.21E-02 | 1.05E+01  | 7.13E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 3.17E+02 | 1.81E-02  | 3.77E-03 | 8.28E+00 | 6.38E-03 | 1.19E+00 | 2.03E-02 | 1.36E+01 | 1.53E-02 | 3.75E-01  | 3.21E-02 | 1.05E+01  | 7.13E-02 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.64E+02 | 3.06E-01  | 3.63E-03 | 1.60E-01 | 8.28E-03 | 4.95E-01 | 2.77E-03 | 2.43E+00 | 3.26E-03 | 1.44E+00  | 2.24E-01 | 3.97E-02  | 1.71E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 5.48E+00 | Clark.G. 1944 (media de 19 monos araña adultos)                              |
| Ingesta de alimentos (kg/d ph)    | 1.11E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 4.58E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                              |
| Rango de hábitat (ha)             | 2.76E+02 | Wallace 2008 (promedio de ámbitos de hogar presentado en la Tabla 1)         |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |





Tabla 35    Águila Crestada

| Águila Crestada                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 4.65E-02 | 1.76E-06  | 7.36E-07 | 1.21E-04 | 3.42E-07 | 6.38E-04 | 3.96E-05 | 1.33E-02 | 4.49E-07 | 2.20E-04  | 4.69E-05 | 3.06E-04  | 1.74E-05 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 1.17E-02  | 9.16E-04 | 3.76E-02 | 8.99E-03 | 4.15E-01 | 2.70E-02 | 6.10E-01 | 1.52E-01 | 0.00E+00  | 3.60E-02 | 0.00E+00  | 1.47E-01 |
| Dosis de alimentos (mg/d)       |                               | 4.65E-02 | 1.17E-02  | 9.16E-04 | 3.77E-02 | 9.00E-03 | 4.16E-01 | 2.70E-02 | 6.24E-01 | 1.52E-01 | 2.20E-04  | 3.60E-02 | 3.06E-04  | 1.47E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.65E-02 | 1.17E-02  | 9.16E-04 | 3.77E-02 | 9.00E-03 | 4.16E-01 | 2.70E-02 | 6.24E-01 | 1.52E-01 | 2.20E-04  | 3.60E-02 | 3.06E-04  | 1.47E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 9.67E-02 | 1.22E-04  | 1.22E-04 | 2.62E-03 | 2.44E-05 | 1.22E-04 | 1.22E-04 | 1.46E-03 | 1.22E-04 | 7.31E-05  | 1.22E-04 | 5.37E-03  | 2.44E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 9.67E-02 | 1.22E-04  | 1.22E-04 | 2.62E-03 | 2.44E-05 | 1.22E-04 | 1.22E-04 | 1.46E-03 | 1.22E-04 | 7.31E-05  | 1.22E-04 | 5.37E-03  | 2.44E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.43E-01 | 1.18E-02  | 1.04E-03 | 4.04E-02 | 9.02E-03 | 4.16E-01 | 2.72E-02 | 6.25E-01 | 1.52E-01 | 2.93E-04  | 3.62E-02 | 5.68E-03  | 1.47E-01 |
| PC ajustado (mg/kg/d)           |                               | 4.85E-02 | 4.01E-03  | 3.52E-04 | 1.37E-02 | 3.06E-03 | 1.41E-01 | 9.21E-03 | 2.12E-01 | 5.14E-02 | 9.92E-05  | 1.23E-02 | 1.92E-03  | 4.98E-02 |
| RH ajustado (mg/kg/d)           |                               | 4.85E-02 | 4.01E-03  | 3.52E-04 | 1.37E-02 | 3.06E-03 | 1.41E-01 | 9.21E-03 | 2.12E-01 | 5.14E-02 | 9.92E-05  | 1.23E-02 | 1.92E-03  | 4.98E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 4.85E-02 | 4.01E-03  | 3.52E-04 | 1.37E-02 | 3.06E-03 | 1.41E-01 | 9.21E-03 | 2.12E-01 | 5.14E-02 | 9.92E-05  | 1.23E-02 | 1.92E-03  | 4.98E-02 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1.16E-02 | NA        | 1.57E-04 | 6.58E-04 | 2.08E-03 | 5.30E-02 | 1.21E-03 | 5.23E-02 | 3.16E-02 | 2.84E-05  | 4.23E-02 | 7.21E-06  | 1.45E-01 |

Parámetros del Modelo

|                                   |          |                                            |
|-----------------------------------|----------|--------------------------------------------|
| Peso corporal (PC; kg)            | 2.95E+00 | Kiff et al., 1989                          |
| Ingesta de alimentos (kg/d ph)    | 1.95E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de agua (L/d)             | 1.22E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | US EPA 1993 (águila calva)                 |
| Rango de hábitat (ha)             | 8.00E+02 | Robinson 1994                              |
| Factor de rango de hábitat (RH)   | 1.00     |                                            |



Tabla 36    Martin Pescador Grande

| Martin Pescador Grande          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 2.64E+01 | 3.19E-03  | 2.79E-01 | 2.63E+00 | 2.51E-02 | 3.84E-01 | 3.93E-02 | 4.03E-01 | 9.43E-02 | 3.58E-02  | 1.11E-01 | 9.89E+00  | 1.01E-01 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 2.64E+01 | 3.19E-03  | 2.79E-01 | 2.63E+00 | 2.51E-02 | 3.84E-01 | 3.93E-02 | 4.03E-01 | 9.43E-02 | 3.58E-02  | 1.11E-01 | 9.89E+00  | 1.01E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.64E+01 | 3.19E-03  | 2.79E-01 | 2.63E+00 | 2.51E-02 | 3.84E-01 | 3.93E-02 | 4.03E-01 | 9.43E-02 | 3.58E-02  | 1.11E-01 | 9.89E+00  | 1.01E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.70E-02 | 3.41E-05  | 3.41E-05 | 7.34E-04 | 6.81E-06 | 3.41E-05 | 3.41E-05 | 4.09E-04 | 3.41E-05 | 2.04E-05  | 3.41E-05 | 1.50E-03  | 6.81E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.70E-02 | 3.41E-05  | 3.41E-05 | 7.34E-04 | 6.81E-06 | 3.41E-05 | 3.41E-05 | 4.09E-04 | 3.41E-05 | 2.04E-05  | 3.41E-05 | 1.50E-03  | 6.81E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 2.64E+01 | 3.23E-03  | 2.79E-01 | 2.63E+00 | 2.51E-02 | 3.84E-01 | 3.93E-02 | 4.03E-01 | 9.44E-02 | 3.58E-02  | 1.11E-01 | 9.89E+00  | 1.01E-01 |
| PC ajustado (mg/kg/d)           |                               | 8.39E+01 | 1.02E-02  | 8.86E-01 | 8.34E+00 | 7.98E-02 | 1.22E+00 | 1.25E-01 | 1.28E+00 | 3.00E-01 | 1.14E-01  | 3.53E-01 | 3.14E+01  | 3.20E-01 |
| RH ajustado (mg/kg/d)           |                               | 8.39E+01 | 1.02E-02  | 8.86E-01 | 8.34E+00 | 7.98E-02 | 1.22E+00 | 1.25E-01 | 1.28E+00 | 3.00E-01 | 1.14E-01  | 3.53E-01 | 3.14E+01  | 3.20E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 8.39E+01 | 1.02E-02  | 8.86E-01 | 8.34E+00 | 7.98E-02 | 1.22E+00 | 1.25E-01 | 1.28E+00 | 3.00E-01 | 1.14E-01  | 3.53E-01 | 3.14E+01  | 3.20E-01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 2.01E+01 | NA        | 3.96E-01 | 4.01E-01 | 5.43E-02 | 4.59E-01 | 1.64E-02 | 3.16E-01 | 1.84E-01 | 3.25E-02  | 1.22E+00 | 1.18E-01  | 9.32E-01 |

Parámetros del Modelo

|                                   |          |                                                                                                         |
|-----------------------------------|----------|---------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.15E-01 | Wildbirds Unlimited, 2009                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.60E-01 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de agua (L/d)             | 3.41E-02 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Rango de hábitat (ha)             | 3.90E-01 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                         |



Tabla 37 Armadillo

| Armadillo                       |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 1.09E+04 | 3.00E+00  | 6.03E-01 | 4.82E+01 | 1.14E+00 | 2.31E+01 | 8.64E+00 | 4.89E+01 | 7.61E+01 | 3.27E+00  | 5.29E+00 | 2.98E+01  | 6.29E+01 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.09E+04 | 3.00E+00  | 6.03E-01 | 4.82E+01 | 1.14E+00 | 2.31E+01 | 8.64E+00 | 4.89E+01 | 7.61E+01 | 3.27E+00  | 5.29E+00 | 2.98E+01  | 6.29E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.09E+04 | 3.00E+00  | 6.03E-01 | 4.82E+01 | 1.14E+00 | 2.31E+01 | 8.64E+00 | 4.89E+01 | 7.61E+01 | 3.27E+00  | 5.29E+00 | 2.98E+01  | 6.29E+01 |
| Dosis de suelo (mg/d)           |                               | 2.22E+03 | 5.10E-01  | 2.55E-01 | 7.26E+00 | 5.24E-02 | 1.27E+01 | 1.39E+00 | 3.22E+01 | 1.53E+00 | 2.11E+00  | 2.24E-01 | 5.45E-01  | 1.95E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.22E+03 | 5.10E-01  | 2.55E-01 | 7.26E+00 | 5.24E-02 | 1.27E+01 | 1.39E+00 | 3.22E+01 | 1.53E+00 | 2.11E+00  | 2.24E-01 | 5.45E-01  | 1.95E+01 |
| Dosis de agua (mg/d)            |                               | 3.97E-01 | 5.00E-04  | 5.00E-04 | 1.08E-02 | 1.00E-04 | 5.00E-04 | 5.00E-04 | 6.00E-03 | 5.00E-04 | 3.00E-04  | 5.00E-04 | 2.21E-02  | 1.00E-03 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.97E-01 | 5.00E-04  | 5.00E-04 | 1.08E-02 | 1.00E-04 | 5.00E-04 | 5.00E-04 | 6.00E-03 | 5.00E-04 | 3.00E-04  | 5.00E-04 | 2.21E-02  | 1.00E-03 |
| Alimentos + suelo + agua (mg/d) |                               | 1.32E+04 | 3.51E+00  | 8.59E-01 | 5.55E+01 | 1.20E+00 | 3.57E+01 | 1.00E+01 | 8.11E+01 | 7.76E+01 | 5.38E+00  | 5.52E+00 | 3.04E+01  | 8.24E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.19E+03 | 5.85E-01  | 1.43E-01 | 9.25E+00 | 1.99E-01 | 5.96E+00 | 1.67E+00 | 1.35E+01 | 1.29E+01 | 8.96E-01  | 9.20E-01 | 5.07E+00  | 1.37E+01 |
| RH ajustado (mg/kg/d)           |                               | 2.19E+03 | 5.85E-01  | 1.43E-01 | 9.25E+00 | 1.99E-01 | 5.96E+00 | 1.67E+00 | 1.35E+01 | 1.29E+01 | 8.96E-01  | 9.20E-01 | 5.07E+00  | 1.37E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.19E+03 | 5.85E-01  | 1.43E-01 | 9.25E+00 | 1.99E-01 | 5.96E+00 | 1.67E+00 | 1.35E+01 | 1.29E+01 | 8.96E-01  | 9.20E-01 | 5.07E+00  | 1.37E+01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.14E+03 | 9.92E+00  | 1.38E-01 | 1.78E-01 | 2.59E-01 | 2.48E+00 | 2.28E-01 | 2.41E+00 | 2.75E+00 | 3.45E+00  | 6.43E+00 | 1.93E-02  | 3.30E+00 |

Parámetros del Modelo

|                                   |          |                                                      |
|-----------------------------------|----------|------------------------------------------------------|
| Peso corporal (PC; kg)            | 6.00E+00 | Frappell et al. 1998                                 |
| Ingesta de alimentos (kg/d ph)    | 1.25E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de agua (L/d)             | 5.00E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de suelo/sedimento (kg/d) | 5.10E-02 | Beyer et al., 1994 (17% del CIA)                     |
| Rango de hábitat (ha)             | 1.00E+01 | Loughry et al., 1997                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                      |



Tabla 38 Loro Cabeciazul

| Loro Cabeciazul                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 1.29E+02 | 7.85E-03  | 7.85E-04 | 4.85E+00 | 2.80E-03 | 4.85E-01 | 6.43E-03 | 4.20E+00 | 7.07E-03 | 2.19E-01  | 2.88E-03 | 4.16E+00  | 3.00E-02 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.29E+02 | 7.85E-03  | 7.85E-04 | 4.85E+00 | 2.80E-03 | 4.85E-01 | 6.43E-03 | 4.20E+00 | 7.07E-03 | 2.19E-01  | 2.88E-03 | 4.16E+00  | 3.00E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.29E+02 | 7.85E-03  | 7.85E-04 | 4.85E+00 | 2.80E-03 | 4.85E-01 | 6.43E-03 | 4.20E+00 | 7.07E-03 | 2.19E-01  | 2.88E-03 | 4.16E+00  | 3.00E-02 |
| Dosis de suelo (mg/d)           |                               | 1.14E+02 | 2.62E-02  | 1.31E-02 | 3.73E-01 | 2.69E-03 | 6.50E-01 | 7.14E-02 | 1.65E+00 | 7.85E-02 | 1.08E-01  | 1.15E-02 | 2.80E-02  | 1.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.14E+02 | 2.62E-02  | 1.31E-02 | 3.73E-01 | 2.69E-03 | 6.50E-01 | 7.14E-02 | 1.65E+00 | 7.85E-02 | 1.08E-01  | 1.15E-02 | 2.80E-02  | 1.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.06E-02 | 2.59E-05  | 2.59E-05 | 5.59E-04 | 5.18E-06 | 2.59E-05 | 2.59E-05 | 3.11E-04 | 2.59E-05 | 1.56E-05  | 2.59E-05 | 1.14E-03  | 5.18E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.06E-02 | 2.59E-05  | 2.59E-05 | 5.59E-04 | 5.18E-06 | 2.59E-05 | 2.59E-05 | 3.11E-04 | 2.59E-05 | 1.56E-05  | 2.59E-05 | 1.14E-03  | 5.18E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 2.43E+02 | 3.41E-02  | 1.39E-02 | 5.22E+00 | 5.49E-03 | 1.14E+00 | 7.79E-02 | 5.85E+00 | 8.56E-02 | 3.28E-01  | 1.44E-02 | 4.19E+00  | 1.03E+00 |
| PC ajustado (mg/kg/d)           |                               | 8.29E+02 | 1.16E-01  | 4.74E-02 | 1.78E+01 | 1.87E-02 | 3.88E+00 | 2.66E-01 | 2.00E+01 | 2.92E-01 | 1.12E+00  | 4.92E-02 | 1.43E+01  | 3.52E+00 |
| RH ajustado (mg/kg/d)           |                               | 8.29E+02 | 1.16E-01  | 4.74E-02 | 1.78E+01 | 1.87E-02 | 3.88E+00 | 2.66E-01 | 2.00E+01 | 2.92E-01 | 1.12E+00  | 4.92E-02 | 1.43E+01  | 3.52E+00 |
| CS ajustada (mg/kg/d)           |                               | 8.29E+02 | 1.16E-01  | 4.74E-02 | 1.78E+01 | 1.87E-02 | 3.88E+00 | 2.66E-01 | 2.00E+01 | 2.92E-01 | 1.12E+00  | 4.92E-02 | 1.43E+01  | 3.52E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 8.29E+02 | 1.16E-01  | 4.74E-02 | 1.78E+01 | 1.87E-02 | 3.88E+00 | 2.66E-01 | 2.00E+01 | 2.92E-01 | 1.12E+00  | 4.92E-02 | 1.43E+01  | 3.52E+00 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1.99E+02 | NA        | 2.12E-02 | 8.56E-01 | 1.27E-02 | 1.46E+00 | 3.49E-02 | 4.93E+00 | 1.79E-01 | 3.19E-01  | 1.70E-01 | 5.36E-02  | 1.02E+01 |

Parámetros del Modelo

|                                   |          |                                                                                                    |
|-----------------------------------|----------|----------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.93E-01 | Gilardi y Munn, 1988                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.09E-01 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de agua (L/d)             | 2.59E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de suelo/sedimento (kg/d) | 2.62E-03 | Se asume que sea el 10% del CIA debido a las marcas dejadas por las aves en las paredes de arcilla |
| Rango de hábitat (ha)             | 1.67E+01 | Robinson et al. 2000                                                                               |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                    |
| Factor de cubierta de suelo (CS)  | 1.00     |                                                                                                    |



Tabla 39    Zorzalito de Swainson

| Zorzalito de Swainson           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 2.20E+02 | 6.04E-02  | 1.21E-02 | 9.70E-01 | 2.30E-02 | 4.64E-01 | 1.74E-01 | 9.85E-01 | 1.53E+00 | 6.59E-02  | 1.07E-01 | 6.00E-01  | 1.27E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 2.20E+02 | 6.04E-02  | 1.21E-02 | 9.70E-01 | 2.30E-02 | 4.64E-01 | 1.74E-01 | 9.85E-01 | 1.53E+00 | 6.59E-02  | 1.07E-01 | 6.00E-01  | 1.27E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.20E+02 | 6.04E-02  | 1.21E-02 | 9.70E-01 | 2.30E-02 | 4.64E-01 | 1.74E-01 | 9.85E-01 | 1.53E+00 | 6.59E-02  | 1.07E-01 | 6.00E-01  | 1.27E+00 |
| Dosis de suelo (mg/d)           |                               | 5.47E+00 | 1.26E-03  | 6.28E-04 | 1.79E-02 | 1.29E-04 | 3.12E-02 | 3.43E-03 | 7.93E-02 | 3.77E-03 | 5.19E-03  | 5.53E-04 | 1.34E-03  | 4.80E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 5.47E+00 | 1.26E-03  | 6.28E-04 | 1.79E-02 | 1.29E-04 | 3.12E-02 | 3.43E-03 | 7.93E-02 | 3.77E-03 | 5.19E-03  | 5.53E-04 | 1.34E-03  | 4.80E-02 |
| Dosis de agua (mg/d)            |                               | 4.55E-03 | 5.73E-06  | 5.73E-06 | 1.23E-04 | 1.15E-06 | 5.73E-06 | 5.73E-06 | 6.88E-05 | 5.73E-06 | 3.44E-06  | 5.73E-06 | 2.53E-04  | 1.15E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.55E-03 | 5.73E-06  | 5.73E-06 | 1.23E-04 | 1.15E-06 | 5.73E-06 | 5.73E-06 | 6.88E-05 | 5.73E-06 | 3.44E-06  | 5.73E-06 | 2.53E-04  | 1.15E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 2.26E+02 | 6.17E-02  | 1.28E-02 | 9.88E-01 | 2.32E-02 | 4.95E-01 | 1.77E-01 | 1.06E+00 | 1.53E+00 | 7.11E-02  | 1.07E-01 | 6.02E-01  | 1.31E+00 |
| PC ajustado (mg/kg/d)           |                               | 7.33E+03 | 2.00E+00  | 4.15E-01 | 3.21E+01 | 7.52E-01 | 1.61E+01 | 5.76E+00 | 3.46E+01 | 4.98E+01 | 2.31E+00  | 3.48E+00 | 1.95E+01  | 4.27E+01 |
| RH ajustado (mg/kg/d)           |                               | 7.33E+03 | 2.00E+00  | 4.15E-01 | 3.21E+01 | 7.52E-01 | 1.61E+01 | 5.76E+00 | 3.46E+01 | 4.98E+01 | 2.31E+00  | 3.48E+00 | 1.95E+01  | 4.27E+01 |
| CS ajustada (mg/kg/d)           |                               | 7.33E+03 | 2.00E+00  | 4.15E-01 | 3.21E+01 | 7.52E-01 | 1.61E+01 | 5.76E+00 | 3.46E+01 | 4.98E+01 | 2.31E+00  | 3.48E+00 | 1.95E+01  | 4.27E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 7.33E+03 | 2.00E+00  | 4.15E-01 | 3.21E+01 | 7.52E-01 | 1.61E+01 | 5.76E+00 | 3.46E+01 | 4.98E+01 | 2.31E+00  | 3.48E+00 | 1.95E+01  | 4.27E+01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1,757.0  | NA        | 0.2      | 1.5      | 0.5      | 6.0      | 0.8      | 8.5      | 30.6     | 0.7       | 12.0     | 0.1       | 124.1    |

Parámetros del Modelo

|                                   |          |                                                                |
|-----------------------------------|----------|----------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.08E-02 | Dunning 1984 (valor medio utilizado)                           |
| Ingesta de alimentos (kg/d ph)    | 2.52E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de agua (L/d)             | 5.73E-03 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 1.26E-04 | Sample y Suter, 1994; ingesta de suelo del petirrojo americano |
| Rango de hábitat (ha)             | 4.20E-01 | Sample y Suter, 1994; Rango de hábitat del petirrojo americano |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                |



4 ESTIMADO DE LÍMITE SUPERIOR PARA LA EVALUACIÓN DE IMPACTOS

Tabla 40    Página De Resumen

|                        |                                                |           |               |         |                                 |                                           |           |                                        |         |           |                                                                                     |           |         |
|------------------------|------------------------------------------------|-----------|---------------|---------|---------------------------------|-------------------------------------------|-----------|----------------------------------------|---------|-----------|-------------------------------------------------------------------------------------|-----------|---------|
| Nombre del Proyecto    | Mina Petaquilla                                |           |               |         |                                 |                                           | Archivos: | (1) Página de Resumen                  |         |           |  |           |         |
| Número de Proyecto     | 07-1334-0018                                   |           | Creado por:   | LSC     | (2) Concentraciones Ambientales |                                           |           |                                        |         |           |                                                                                     |           |         |
| Fecha:                 | 10 de Junio de 2010                            |           | Revisado por: | ADB     | (3) Modelos de Absorción        |                                           |           |                                        |         |           |                                                                                     |           |         |
| Notas:                 | Caso de Impacto - Estimado del Límite Superior |           |               |         |                                 |                                           |           | (4) Valores de Referencia de Toxicidad |         |           |                                                                                     |           |         |
|                        |                                                |           |               |         |                                 |                                           |           | (5) Cálculos del Rango de Hábitat      |         |           |                                                                                     |           |         |
|                        |                                                |           |               |         |                                 | (6) Páginas de Cálculo Para Cada Receptor |           |                                        |         |           |                                                                                     |           |         |
|                        | Aluminio                                       | Antimonio | Arsénico      | Bario   | Cadmio                          | Cromo                                     | Cobalto   | Cobre                                  | Plomo   | Molibdeno | Selenio                                                                             | Estroncio | Vanadio |
| jaguar                 | 0.24                                           | 4.2E-03   | 0.03          | 0.00    | 0.00                            | 0.01                                      | 0.00      | 0.01                                   | 2.1E-03 | 0.05      | 0.05                                                                                | 4.2E-04   | 2.2E-03 |
| tapir                  | 146.53                                         | 0.32      | 0.01          | 0.04    | 0.01                            | 0.46                                      | 0.01      | 5.90                                   | 0.01    | 0.48      | 0.49                                                                                | 0.03      | 0.07    |
| mono araña             | 164.85                                         | 0.31      | 4.6E-03       | 0.16    | 0.01                            | 0.50                                      | 2.9E-03   | 5.41                                   | 3.7E-03 | 1.45      | 0.27                                                                                | 0.04      | 0.02    |
| águila crestada        | 0.01                                           | NA        | 2.0E-04       | 6.9E-04 | 2.3E-03                         | 0.05                                      | 1.2E-03   | 0.06                                   | 0.03    | 2.6E-04   | 0.04                                                                                | 7.2E-06   | 0.15    |
| martín pescador grande | 30.16                                          | NA        | 3.96          | 1.04    | 0.27                            | 1.01                                      | 0.25      | 1.05                                   | 0.31    | 0.91      | 4.63                                                                                | 0.12      | 0.93    |
| armadillo              | 1,136.77                                       | 9.91      | 0.14          | 0.18    | 0.32                            | 2.48                                      | 0.23      | 4.02                                   | 2.80    | 3.46      | 7.48                                                                                | 0.02      | 3.31    |
| loro cabeciazul        | 199.16                                         | NA        | 0.02          | 0.86    | 0.02                            | 1.46                                      | 0.04      | 11.08                                  | 0.18    | 0.32      | 0.21                                                                                | 0.06      | 10.30   |
| zorzalito de swainson  | 1,759.63                                       | NA        | 0.19          | 1.54    | 0.63                            | 6.06                                      | 0.76      | 12.33                                  | 31.16   | 0.66      | 13.97                                                                               | 0.08      | 124.72  |



Tabla 41 Concentraciones Ambientales

|                               |          | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio | Porcentaje de Humedad |
|-------------------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|---------|-----------------------|
| Ítem                          | Unidades |          |           |          |          |          |          |          |          |          |           |          |           |         |                       |
| suelo                         | 4.36E+04 | 1.00E+01 | 5.24E+00  | 1.43E+02 | 1.27E+00 | 2.49E+02 | 2.74E+01 | 1.31E+03 | 3.06E+01 | 4.14E+01 | 5.13E+00  | 1.10E+01 | 3.84E+02  |         |                       |
| agua                          | 4.60E-01 | 2.00E-04 | 3.00E-03  | 4.00E-02 | 2.00E-04 | 6.60E-04 | 4.60E-03 | 1.00E-02 | 5.00E-04 | 2.00E-02 | 8.00E-04  | 4.41E-02 | 1.00E-03  |         |                       |
| gusanos                       | 8.76E+03 | 2.40E+00 | 5.06E-01  | 3.86E+01 | 1.14E+00 | 1.85E+01 | 6.93E+00 | 5.46E+01 | 6.20E+01 | 2.62E+00 | 4.93E+00  | 2.45E+01 | 5.06E+01  | 0.76    | 0.76                  |
| hojas                         | 3.10E+03 | 1.55E-01 | 6.89E-02  | 2.61E+01 | 7.18E-02 | 1.15E+01 | 2.65E-01 | 3.89E+02 | 1.29E-01 | 1.19E+00 | 8.06E-01  | 1.07E+02 | 6.91E-01  | 0.69    | 0.69                  |
| fruta                         | 1.18E+03 | 7.22E-02 | 1.06E-02  | 4.45E+01 | 3.54E-02 | 4.47E+00 | 6.04E-02 | 8.91E+01 | 7.43E-02 | 2.02E+00 | 3.97E-02  | 3.92E+01 | 3.05E-01  | 0.76    | 0.76                  |
| peces                         | 2.48E+02 | 2.00E-02 | 1.75E+01  | 4.28E+01 | 7.88E-01 | 5.30E+00 | 3.77E+00 | 8.41E+00 | 9.85E-01 | 6.28E+00 | 2.65E+00  | 6.20E+01 | 6.32E-01  | 0.75    | 0.75                  |
| mamíferos herbívoros grandes  | 4.24E-01 | 1.88E-05 | 1.80E-05  | 3.38E-04 | 3.70E-06 | 6.07E-03 | 7.68E-04 | 3.31E-01 | 8.65E-06 | 7.48E-04 | 1.05E-03  | 2.68E-03 | 7.11E-04  | 0.68    | 0.68                  |
| mamíferos herbívoros pequeños | 4.77E-01 | 1.80E-05 | 9.53E-06  | 1.24E-03 | 4.78E-06 | 6.57E-03 | 4.19E-04 | 3.03E-01 | 5.20E-06 | 2.27E-03 | 5.88E-04  | 3.22E-03 | 1.94E-04  | 0.68    | 0.68                  |
| mamíferos pequeños            |          | 3.84E-02 | 9.76E-03  | 3.86E-01 | 1.02E-01 | 4.26E+00 | 2.78E-01 | 6.95E+00 | 1.57E+00 |          | 3.91E-01  |          | 1.51E+00  | 0.68    | 0.68                  |

Nota: La concentración en mamíferos herbívoros grandes se calcula a partir de la dosis diaria final del tapir \* BTF (ORNL 1984).  
La concentración en mamíferos herbívoros pequeños se calcula a partir de la dosis diaria final del mono araña \* BTF (ORNL 1984).

Tabla 42    Tipo de Modelos de Absorción

|       |   |                               | Aluminio     | Antimonio    | Arsénico     | Bario        | Cadmio       | Cromo        | Cobalto      | Cobre        | Plomo        | Molibdeno    | Selenio      | Estroncio    | Vanadio      |
|-------|---|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Medio | a | Ítem                          |              |              |              |              |              |              |              |              |              |              |              |              |              |
| Suelo | a | gusanos                       | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | hojas                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | fruta                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | peces                         | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado | Pronosticado |
| Suelo | a | mamíferos herbívoros grandes  | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos herbívoros pequeños | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     | BTF-ORNL     |
| Suelo | a | mamíferos pequeños            |              | BAF-ECO      | LR-ECO       | BAF-ECO      | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       | LR-ECO       |              | LR-ECO       |              | BAF-ECO      |

LEYENDA:

BTF-ORNL

LR-ORNL

BAF-ORNL

BAF-ECO

Pronosticado

BTF-EPA

Factor de transferencia de la carne de vacuno a partir de los informes del Oak Ridge National Laboratory

Regresión lineal a partir de los informes del Oak Ridge National Laboratory

Factor de bioacumulación a partir de los informes del Oak Ridge National Laboratory

Factor de bioacumulación de ECO-SSL

Los datos fueron pronosticados a partir de los datos del área del estudio de línea base

Factor de transferencia de carne de vacuno de US EPA 1999



Tabla 43 Valor de Referencia de Toxicidad

|                        |          | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|------------------------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| Receptor               | PC (kg)  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| jaguar                 | 8.06E+01 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| tapir                  | 2.50E+02 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| mono araña             | 5.48E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| águila crestada        | 2.95E+00 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| martín pescador grande | 3.15E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| armadillo              | 6.00E+00 | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| loro cabeciazul        | 2.93E-01 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| zorzalito de swainson  | 3.08E-02 | 4.17E+00 |           | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |

Nota: Se utilizó valores NOAEL para todos los receptores.

Tabla 44 Cálculos del Rango de Hábitat

| Receptor                 | Rango de Hábitat (ha) | Factor de Rango de Hábitat |
|--------------------------|-----------------------|----------------------------|
| jaguar                   | 3.82E+03              | 1.00                       |
| tapir                    | 1.25E+02              | 1.00                       |
| mono araña               | 2.76E+02              | 1.00                       |
| águila crestada          | 8.00E+02              | 1.00                       |
| martín pescador grande   | 3.90E-01              | 1.00                       |
| armadillo                | 1.00E+01              | 1.00                       |
| loro cabeciazul          | 1.67E+01              | 1.00                       |
| zorzalito de swainson    | 4.20E-01              | 1.00                       |
| Huella del Proyecto (ha) | 41,351                |                            |

Tabla 45 Jaguar

| Jaguar                          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.10                            | peces                         | 3.47E+01 | 2.80E-03  | 2.45E+00 | 5.99E+00 | 1.10E-01 | 7.41E-01 | 5.28E-01 | 1.18E+00 | 1.38E-01 | 8.80E-01  | 3.71E-01 | 8.67E+00  | 8.85E-02 |
| 0.30                            | mamíferos herbívoros grandes  | 1.78E-01 | 7.90E-06  | 7.55E-06 | 1.42E-04 | 1.55E-06 | 2.55E-03 | 3.23E-04 | 1.39E-01 | 3.63E-06 | 3.14E-04  | 4.40E-04 | 1.12E-03  | 2.99E-04 |
| 0.30                            | mamíferos herbívoros pequeños | 2.00E-01 | 7.58E-06  | 4.00E-06 | 5.22E-04 | 2.01E-06 | 2.76E-03 | 1.76E-04 | 1.27E-01 | 2.19E-06 | 9.52E-04  | 2.47E-04 | 1.35E-03  | 8.15E-05 |
| 0.30                            | mamíferos pequeños            | 0.00E+00 | 1.61E-02  | 4.10E-03 | 1.62E-01 | 4.29E-02 | 1.79E+00 | 1.17E-01 | 2.92E+00 | 6.58E-01 | 0.00E+00  | 1.64E-01 | 0.00E+00  | 6.35E-01 |
| Dosis de alimentos (mg/d)       |                               | 3.51E+01 | 1.90E-02  | 2.45E+00 | 6.15E+00 | 1.53E-01 | 2.54E+00 | 6.45E-01 | 4.36E+00 | 7.96E-01 | 8.81E-01  | 5.35E-01 | 8.68E+00  | 7.24E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.51E+01 | 1.90E-02  | 2.45E+00 | 6.15E+00 | 1.53E-01 | 2.54E+00 | 6.45E-01 | 4.36E+00 | 7.96E-01 | 8.81E-01  | 5.35E-01 | 8.68E+00  | 7.24E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.37E+00 | 1.03E-03  | 1.54E-02 | 2.06E-01 | 1.03E-03 | 3.40E-03 | 2.37E-02 | 5.14E-02 | 2.57E-03 | 1.03E-01  | 4.12E-03 | 2.27E-01  | 5.14E-03 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.37E+00 | 1.03E-03  | 1.54E-02 | 2.06E-01 | 1.03E-03 | 3.40E-03 | 2.37E-02 | 5.14E-02 | 2.57E-03 | 1.03E-01  | 4.12E-03 | 2.27E-01  | 5.14E-03 |
| Alimentos + suelo + agua (mg/d) |                               | 3.75E+01 | 2.00E-02  | 2.47E+00 | 6.36E+00 | 1.54E-01 | 2.54E+00 | 6.69E-01 | 4.41E+00 | 7.99E-01 | 9.84E-01  | 5.39E-01 | 8.90E+00  | 7.29E-01 |
| PC ajustado (mg/kg/d)           |                               | 4.65E-01 | 2.48E-04  | 3.06E-02 | 7.89E-02 | 1.91E-03 | 3.15E-02 | 8.30E-03 | 5.48E-02 | 9.91E-03 | 1.22E-02  | 6.69E-03 | 1.10E-01  | 9.04E-03 |
| RH ajustado (mg/kg/d)           |                               | 4.65E-01 | 2.48E-04  | 3.06E-02 | 7.89E-02 | 1.91E-03 | 3.15E-02 | 8.30E-03 | 5.48E-02 | 9.91E-03 | 1.22E-02  | 6.69E-03 | 1.10E-01  | 9.04E-03 |
| Dosis diaria final (mg/kg/día)  |                               | 4.65E-01 | 2.48E-04  | 3.06E-02 | 7.89E-02 | 1.91E-03 | 3.15E-02 | 8.30E-03 | 5.48E-02 | 9.91E-03 | 1.22E-02  | 6.69E-03 | 1.10E-01  | 9.04E-03 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 2.41E-01 | 4.20E-03  | 2.94E-02 | 1.52E-03 | 2.48E-03 | 1.31E-02 | 1.13E-03 | 9.78E-03 | 2.11E-03 | 4.69E-02  | 4.68E-02 | 4.20E-04  | 2.17E-03 |

Parámetros del Modelo

|                                   |          |                                                                                                      |
|-----------------------------------|----------|------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 8.06E+01 | Cascelli de Azevedo y Murray 2007 (media de machos y hembras)                                        |
| Ingesta de alimentos (kg/d ph)    | 1.40E+00 | Emmons 1987 (en ph)                                                                                  |
| Ingesta de agua (L/d)             | 5.14E+00 | US EPA 1993 (CIA calculado: Peso corporal promedio utilizado (0.099 Peso^0.9) para machos y hembras) |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                                                      |
| Rango de hábitat (ha)             | 3.82E+03 | Cascelli de Azevedo y Murray 2007 (rango de hogar de machos y hembras utilizado conservadoramente)   |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                      |



Tabla 46 Tapir

| Tapir                           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 6.42E+04 | 3.22E+00  | 1.43E+00 | 5.42E+02 | 1.49E+00 | 2.39E+02 | 5.49E+00 | 8.07E+03 | 2.68E+00 | 2.48E+01  | 1.67E+01 | 2.23E+03  | 1.43E+01 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 6.42E+04 | 3.22E+00  | 1.43E+00 | 5.42E+02 | 1.49E+00 | 2.39E+02 | 5.49E+00 | 8.07E+03 | 2.68E+00 | 2.48E+01  | 1.67E+01 | 2.23E+03  | 1.43E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.42E+04 | 3.22E+00  | 1.43E+00 | 5.42E+02 | 1.49E+00 | 2.39E+02 | 5.49E+00 | 8.07E+03 | 2.68E+00 | 2.48E+01  | 1.67E+01 | 2.23E+03  | 1.43E+01 |
| Dosis de suelo (mg/d)           |                               | 6.45E+03 | 1.48E+00  | 7.75E-01 | 2.11E+01 | 1.88E-01 | 3.68E+01 | 4.05E+00 | 1.94E+02 | 4.52E+00 | 6.12E+00  | 7.58E-01 | 1.62E+00  | 5.68E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.45E+03 | 1.48E+00  | 7.75E-01 | 2.11E+01 | 1.88E-01 | 3.68E+01 | 4.05E+00 | 1.94E+02 | 4.52E+00 | 6.12E+00  | 7.58E-01 | 1.62E+00  | 5.68E+01 |
| Dosis de agua (mg/d)            |                               | 6.55E+00 | 2.85E-03  | 4.27E-02 | 5.70E-01 | 2.85E-03 | 9.40E-03 | 6.55E-02 | 1.42E-01 | 7.12E-03 | 2.85E-01  | 1.14E-02 | 6.28E-01  | 1.42E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 6.55E+00 | 2.85E-03  | 4.27E-02 | 5.70E-01 | 2.85E-03 | 9.40E-03 | 6.55E-02 | 1.42E-01 | 7.12E-03 | 2.85E-01  | 1.14E-02 | 6.28E-01  | 1.42E-02 |
| Alimentos + suelo + agua (mg/d) |                               | 7.07E+04 | 4.70E+00  | 2.25E+00 | 5.64E+02 | 1.68E+00 | 2.76E+02 | 9.60E+00 | 8.26E+03 | 7.20E+00 | 3.12E+01  | 1.75E+01 | 2.23E+03  | 7.11E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.83E+02 | 1.88E-02  | 8.99E-03 | 2.25E+00 | 6.72E-03 | 1.10E+00 | 3.84E-02 | 3.31E+01 | 2.88E-02 | 1.25E-01  | 6.99E-02 | 8.92E+00  | 2.84E-01 |
| RH ajustado (mg/kg/d)           |                               | 2.83E+02 | 1.88E-02  | 8.99E-03 | 2.25E+00 | 6.72E-03 | 1.10E+00 | 3.84E-02 | 3.31E+01 | 2.88E-02 | 1.25E-01  | 6.99E-02 | 8.92E+00  | 2.84E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.83E+02 | 1.88E-02  | 8.99E-03 | 2.25E+00 | 6.72E-03 | 1.10E+00 | 3.84E-02 | 3.31E+01 | 2.88E-02 | 1.25E-01  | 6.99E-02 | 8.92E+00  | 2.84E-01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.47E+02 | 3.19E-01  | 8.64E-03 | 4.35E-02 | 8.73E-03 | 4.60E-01 | 5.24E-03 | 5.90E+00 | 6.13E-03 | 4.80E-01  | 4.89E-01 | 3.39E-02  | 6.84E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.50E+02 | Foerster et al. 2000 (estimado medio utilizado)                              |
| Ingesta de alimentos (kg/d ph)    | 2.07E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 1.42E+01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 1.48E-01 | Beyer et al. (1994) (2.3% para jabalí)                                       |
| Rango de hábitat (ha)             | 1.25E+02 | Foerster y Vaughan 2002 (promedio utilizado)                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |



Tabla 47 Mono Araña

| Mono Araña                      |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 6.89E+02 | 3.46E-02  | 1.53E-02 | 5.82E+00 | 1.60E-02 | 2.56E+00 | 5.89E-02 | 8.66E+01 | 2.87E-02 | 2.66E-01  | 1.79E-01 | 2.39E+01  | 1.54E-01 |
| 0.00                            | fruta                         | 1.05E+03 | 6.43E-02  | 9.41E-03 | 3.96E+01 | 3.15E-02 | 3.98E+00 | 5.38E-02 | 7.93E+01 | 6.61E-02 | 1.80E+00  | 3.53E-02 | 3.49E+01  | 2.71E-01 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.74E+03 | 9.88E-02  | 2.47E-02 | 4.54E+01 | 4.75E-02 | 6.54E+00 | 1.13E-01 | 1.66E+02 | 9.48E-02 | 2.06E+00  | 2.15E-01 | 5.88E+01  | 4.25E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.74E+03 | 9.88E-02  | 2.47E-02 | 4.54E+01 | 4.75E-02 | 6.54E+00 | 1.13E-01 | 1.66E+02 | 9.48E-02 | 2.06E+00  | 2.15E-01 | 5.88E+01  | 4.25E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 2.11E-01 | 9.15E-05  | 1.37E-03 | 1.83E-02 | 9.15E-05 | 3.02E-04 | 2.11E-03 | 4.58E-03 | 2.29E-04 | 9.15E-03  | 3.66E-04 | 2.02E-02  | 4.58E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.11E-01 | 9.15E-05  | 1.37E-03 | 1.83E-02 | 9.15E-05 | 3.02E-04 | 2.11E-03 | 4.58E-03 | 2.29E-04 | 9.15E-03  | 3.66E-04 | 2.02E-02  | 4.58E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.74E+03 | 9.89E-02  | 2.61E-02 | 4.54E+01 | 4.76E-02 | 6.54E+00 | 1.15E-01 | 1.66E+02 | 9.51E-02 | 2.07E+00  | 2.15E-01 | 5.88E+01  | 4.26E-01 |
| PC ajustado (mg/kg/d)           |                               | 3.18E+02 | 1.80E-02  | 4.77E-03 | 8.29E+00 | 8.69E-03 | 1.19E+00 | 2.09E-02 | 3.03E+01 | 1.73E-02 | 3.78E-01  | 3.92E-02 | 1.07E+01  | 7.77E-02 |
| RH ajustado (mg/kg/d)           |                               | 3.18E+02 | 1.80E-02  | 4.77E-03 | 8.29E+00 | 8.69E-03 | 1.19E+00 | 2.09E-02 | 3.03E+01 | 1.73E-02 | 3.78E-01  | 3.92E-02 | 1.07E+01  | 7.77E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 3.18E+02 | 1.80E-02  | 4.77E-03 | 8.29E+00 | 8.69E-03 | 1.19E+00 | 2.09E-02 | 3.03E+01 | 1.73E-02 | 3.78E-01  | 3.92E-02 | 1.07E+01  | 7.77E-02 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.65E+02 | 3.06E-01  | 4.58E-03 | 1.60E-01 | 1.13E-02 | 4.98E-01 | 2.86E-03 | 5.41E+00 | 3.69E-03 | 1.45E+00  | 2.74E-01 | 4.08E-02  | 1.87E-02 |

Parámetros del Modelo

|                                   |          |                                                                              |
|-----------------------------------|----------|------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 5.48E+00 | Clark.G. 1944 (media de 19 monos araña adultos)                              |
| Ingesta de alimentos (kg/d ph)    | 1.11E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.0687 * Peso^0.822 |
| Ingesta de agua (L/d)             | 4.58E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) CIA=0.099 * Peso^0.90   |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 |                                                                              |
| Rango de hábitat (ha)             | 2.76E+02 | Wallace 2008 (promedio de ámbitos de hogar presentado en la Tabla 1)         |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                              |



Tabla 48    Águila Crestada

| Águila Crestada                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 4.66E-02 | 1.76E-06  | 9.30E-07 | 1.21E-04 | 4.66E-07 | 6.41E-04 | 4.09E-05 | 2.95E-02 | 5.08E-07 | 2.21E-04  | 5.74E-05 | 3.14E-04  | 1.89E-05 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 3.75E-03  | 9.52E-04 | 3.76E-02 | 9.96E-03 | 4.16E-01 | 2.71E-02 | 6.78E-01 | 1.53E-01 | 0.00E+00  | 3.81E-02 | 0.00E+00  | 1.47E-01 |
| Dosis de alimentos (mg/d)       |                               | 4.66E-02 | 3.75E-03  | 9.53E-04 | 3.78E-02 | 9.96E-03 | 4.17E-01 | 2.72E-02 | 7.08E-01 | 1.53E-01 | 2.21E-04  | 3.82E-02 | 3.14E-04  | 1.48E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 4.66E-02 | 3.75E-03  | 9.53E-04 | 3.78E-02 | 9.96E-03 | 4.17E-01 | 2.72E-02 | 7.08E-01 | 1.53E-01 | 2.21E-04  | 3.82E-02 | 3.14E-04  | 1.48E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 5.60E-02 | 2.44E-05  | 3.65E-04 | 4.87E-03 | 2.44E-05 | 8.04E-05 | 5.60E-04 | 1.22E-03 | 6.09E-05 | 2.44E-03  | 9.74E-05 | 5.37E-03  | 1.22E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 5.60E-02 | 2.44E-05  | 3.65E-04 | 4.87E-03 | 2.44E-05 | 8.04E-05 | 5.60E-04 | 1.22E-03 | 6.09E-05 | 2.44E-03  | 9.74E-05 | 5.37E-03  | 1.22E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.03E-01 | 3.78E-03  | 1.32E-03 | 4.26E-02 | 9.99E-03 | 4.17E-01 | 2.77E-02 | 7.09E-01 | 1.53E-01 | 2.66E-03  | 3.83E-02 | 5.69E-03  | 1.48E-01 |
| PC ajustado (mg/kg/d)           |                               | 3.48E-02 | 1.28E-03  | 4.47E-04 | 1.45E-02 | 3.38E-03 | 1.41E-01 | 9.39E-03 | 2.40E-01 | 5.18E-02 | 9.01E-04  | 1.30E-02 | 1.93E-03  | 5.00E-02 |
| RH ajustado (mg/kg/d)           |                               | 3.48E-02 | 1.28E-03  | 4.47E-04 | 1.45E-02 | 3.38E-03 | 1.41E-01 | 9.39E-03 | 2.40E-01 | 5.18E-02 | 9.01E-04  | 1.30E-02 | 1.93E-03  | 5.00E-02 |
| Dosis diaria final (mg/kg/día)  |                               | 3.48E-02 | 1.28E-03  | 4.47E-04 | 1.45E-02 | 3.38E-03 | 1.41E-01 | 9.39E-03 | 2.40E-01 | 5.18E-02 | 9.01E-04  | 1.30E-02 | 1.93E-03  | 5.00E-02 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 8.34E-03 | NA        | 2.00E-04 | 6.95E-04 | 2.30E-03 | 5.31E-02 | 1.23E-03 | 5.94E-02 | 3.18E-02 | 2.57E-04  | 4.47E-02 | 7.22E-06  | 1.45E-01 |

Parámetros del Modelo

|                                   |          |                                            |
|-----------------------------------|----------|--------------------------------------------|
| Peso corporal (PC; kg)            | 2.95E+00 | Kiff et al., 1989                          |
| Ingesta de alimentos (kg/d ph)    | 1.95E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de agua (L/d)             | 1.22E-01 | US EPA 1993 - ecuación para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | US EPA 1993 (águila calva)                 |
| Rango de hábitat (ha)             | 8.00E+02 | Robinson 1994                              |
| Factor de rango de hábitat (RH)   | 1.00     |                                            |



Tabla 49    Martin Pescador Grande

| Martin Pescador Grande          |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 3.96E+01 | 3.19E-03  | 2.79E+00 | 6.83E+00 | 1.26E-01 | 8.45E-01 | 6.02E-01 | 1.34E+00 | 1.57E-01 | 1.00E+00  | 4.23E-01 | 9.89E+00  | 1.01E-01 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 3.96E+01 | 3.19E-03  | 2.79E+00 | 6.83E+00 | 1.26E-01 | 8.45E-01 | 6.02E-01 | 1.34E+00 | 1.57E-01 | 1.00E+00  | 4.23E-01 | 9.89E+00  | 1.01E-01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 3.96E+01 | 3.19E-03  | 2.79E+00 | 6.83E+00 | 1.26E-01 | 8.45E-01 | 6.02E-01 | 1.34E+00 | 1.57E-01 | 1.00E+00  | 4.23E-01 | 9.89E+00  | 1.01E-01 |
| Dosis de suelo (mg/d)           |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de agua (mg/d)            |                               | 1.57E-02 | 6.81E-06  | 1.02E-04 | 1.36E-03 | 6.81E-06 | 2.25E-05 | 1.57E-04 | 3.41E-04 | 1.70E-05 | 6.81E-04  | 2.72E-05 | 1.50E-03  | 3.41E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.57E-02 | 6.81E-06  | 1.02E-04 | 1.36E-03 | 6.81E-06 | 2.25E-05 | 1.57E-04 | 3.41E-04 | 1.70E-05 | 6.81E-04  | 2.72E-05 | 1.50E-03  | 3.41E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 3.96E+01 | 3.20E-03  | 2.79E+00 | 6.83E+00 | 1.26E-01 | 8.45E-01 | 6.02E-01 | 1.34E+00 | 1.57E-01 | 1.00E+00  | 4.23E-01 | 9.89E+00  | 1.01E-01 |
| PC ajustado (mg/kg/d)           |                               | 1.26E+02 | 1.02E-02  | 8.86E+00 | 2.17E+01 | 3.99E-01 | 2.68E+00 | 1.91E+00 | 4.26E+00 | 4.99E-01 | 3.19E+00  | 1.34E+00 | 3.14E+01  | 3.20E-01 |
| RH ajustado (mg/kg/d)           |                               | 1.26E+02 | 1.02E-02  | 8.86E+00 | 2.17E+01 | 3.99E-01 | 2.68E+00 | 1.91E+00 | 4.26E+00 | 4.99E-01 | 3.19E+00  | 1.34E+00 | 3.14E+01  | 3.20E-01 |
| Dosis diaria final (mg/kg/día)  |                               | 1.26E+02 | 1.02E-02  | 8.86E+00 | 2.17E+01 | 3.99E-01 | 2.68E+00 | 1.91E+00 | 4.26E+00 | 4.99E-01 | 3.19E+00  | 1.34E+00 | 3.14E+01  | 3.20E-01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 3.02E+01 | NA        | 3.96E+00 | 1.04E+00 | 2.71E-01 | 1.01E+00 | 2.51E-01 | 1.05E+00 | 3.06E-01 | 9.10E-01  | 4.63E+00 | 1.18E-01  | 9.31E-01 |

Parámetros del Modelo

|                                   |          |                                                                                                         |
|-----------------------------------|----------|---------------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.15E-01 | Wildbirds Unlimited, 2009                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.60E-01 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de agua (L/d)             | 3.41E-02 | Sample y Suter, 1994 (martín pescador norteño; ajustado de acuerdo con el pc del martín pescador grande |
| Ingesta de suelo/sedimento (kg/d) | 0.00E+00 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Rango de hábitat (ha)             | 3.90E-01 | Sample y Suter, 1994 (martín pescador norteño)                                                          |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                         |





Tabla 50 Armadillo

| Armadillo                       |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 1.09E+04 | 3.00E+00  | 6.32E-01 | 4.82E+01 | 1.42E+00 | 2.31E+01 | 8.65E+00 | 6.82E+01 | 7.74E+01 | 3.27E+00  | 6.16E+00 | 3.06E+01  | 6.32E+01 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.09E+04 | 3.00E+00  | 6.32E-01 | 4.82E+01 | 1.42E+00 | 2.31E+01 | 8.65E+00 | 6.82E+01 | 7.74E+01 | 3.27E+00  | 6.16E+00 | 3.06E+01  | 6.32E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.09E+04 | 3.00E+00  | 6.32E-01 | 4.82E+01 | 1.42E+00 | 2.31E+01 | 8.65E+00 | 6.82E+01 | 7.74E+01 | 3.27E+00  | 6.16E+00 | 3.06E+01  | 6.32E+01 |
| Dosis de suelo (mg/d)           |                               | 2.22E+03 | 5.10E-01  | 2.67E-01 | 7.26E+00 | 6.49E-02 | 1.27E+01 | 1.39E+00 | 6.67E+01 | 1.56E+00 | 2.11E+00  | 2.61E-01 | 5.59E-01  | 1.96E+01 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.22E+03 | 5.10E-01  | 2.67E-01 | 7.26E+00 | 6.49E-02 | 1.27E+01 | 1.39E+00 | 6.67E+01 | 1.56E+00 | 2.11E+00  | 2.61E-01 | 5.59E-01  | 1.96E+01 |
| Dosis de agua (mg/d)            |                               | 2.28E-01 | 9.93E-05  | 1.49E-03 | 1.99E-02 | 9.93E-05 | 3.28E-04 | 2.28E-03 | 4.97E-03 | 2.48E-04 | 9.93E-03  | 3.97E-04 | 2.19E-02  | 4.97E-04 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.28E-01 | 9.93E-05  | 1.49E-03 | 1.99E-02 | 9.93E-05 | 3.28E-04 | 2.28E-03 | 4.97E-03 | 2.48E-04 | 9.93E-03  | 3.97E-04 | 2.19E-02  | 4.97E-04 |
| Alimentos + suelo + agua (mg/d) |                               | 1.32E+04 | 3.51E+00  | 9.00E-01 | 5.55E+01 | 1.48E+00 | 3.58E+01 | 1.00E+01 | 1.35E+02 | 7.90E+01 | 5.39E+00  | 6.42E+00 | 3.12E+01  | 8.27E+01 |
| PC ajustado (mg/kg/d)           |                               | 2.19E+03 | 5.85E-01  | 1.50E-01 | 9.24E+00 | 2.47E-01 | 5.96E+00 | 1.67E+00 | 2.25E+01 | 1.32E+01 | 8.99E-01  | 1.07E+00 | 5.20E+00  | 1.38E+01 |
| RH ajustado (mg/kg/d)           |                               | 2.19E+03 | 5.85E-01  | 1.50E-01 | 9.24E+00 | 2.47E-01 | 5.96E+00 | 1.67E+00 | 2.25E+01 | 1.32E+01 | 8.99E-01  | 1.07E+00 | 5.20E+00  | 1.38E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 2.19E+03 | 5.85E-01  | 1.50E-01 | 9.24E+00 | 2.47E-01 | 5.96E+00 | 1.67E+00 | 2.25E+01 | 1.32E+01 | 8.99E-01  | 1.07E+00 | 5.20E+00  | 1.38E+01 |
| VRT ajustado (mg/kg/d)          |                               | 1.93E+00 | 5.90E-02  | 1.04E+00 | 5.18E+01 | 7.70E-01 | 2.40E+00 | 7.33E+00 | 5.60E+00 | 4.70E+00 | 2.60E-01  | 1.43E-01 | 2.63E+02  | 4.16E+00 |
| COCIENTE DE PELIGRO             |                               | 1.14E+03 | 9.91E+00  | 1.44E-01 | 1.78E-01 | 3.21E-01 | 2.48E+00 | 2.29E-01 | 4.02E+00 | 2.80E+00 | 3.46E+00  | 7.48E+00 | 1.98E-02  | 3.31E+00 |

Parámetros del Modelo

|                                   |          |                                                      |
|-----------------------------------|----------|------------------------------------------------------|
| Peso corporal (PC; kg)            | 6.00E+00 | Frappell et al. 1998                                 |
| Ingesta de alimentos (kg/d ph)    | 1.25E+00 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de agua (L/d)             | 5.00E-01 | US EPA 1993 (CIA calculado para todos los mamíferos) |
| Ingesta de suelo/sedimento (kg/d) | 5.10E-02 | Beyer et al., 1994 (17% del CIA)                     |
| Rango de hábitat (ha)             | 1.00E+01 | Loughry et al., 1997                                 |
| Factor de rango de hábitat (RH)   | 1.00     |                                                      |



Tabla 51 Loro Cabeciazul

| Loro Cabeciazul                 |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 1.29E+02 | 7.87E-03  | 1.15E-03 | 4.85E+00 | 3.86E-03 | 4.88E-01 | 6.59E-03 | 9.72E+00 | 8.10E-03 | 2.20E-01  | 4.32E-03 | 4.28E+00  | 3.32E-02 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 1.29E+02 | 7.87E-03  | 1.15E-03 | 4.85E+00 | 3.86E-03 | 4.88E-01 | 6.59E-03 | 9.72E+00 | 8.10E-03 | 2.20E-01  | 4.32E-03 | 4.28E+00  | 3.32E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.29E+02 | 7.87E-03  | 1.15E-03 | 4.85E+00 | 3.86E-03 | 4.88E-01 | 6.59E-03 | 9.72E+00 | 8.10E-03 | 2.20E-01  | 4.32E-03 | 4.28E+00  | 3.32E-02 |
| Dosis de suelo (mg/d)           |                               | 1.14E+02 | 2.62E-02  | 1.37E-02 | 3.73E-01 | 3.34E-03 | 6.52E-01 | 7.17E-02 | 3.43E+00 | 8.00E-02 | 1.08E-01  | 1.34E-02 | 2.87E-02  | 1.01E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.14E+02 | 2.62E-02  | 1.37E-02 | 3.73E-01 | 3.34E-03 | 6.52E-01 | 7.17E-02 | 3.43E+00 | 8.00E-02 | 1.08E-01  | 1.34E-02 | 2.87E-02  | 1.01E+00 |
| Dosis de agua (mg/d)            |                               | 1.19E-02 | 5.18E-06  | 7.78E-05 | 1.04E-03 | 5.18E-06 | 1.71E-05 | 1.19E-04 | 2.59E-04 | 1.30E-05 | 5.18E-04  | 2.07E-05 | 1.14E-03  | 2.59E-05 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 1.19E-02 | 5.18E-06  | 7.78E-05 | 1.04E-03 | 5.18E-06 | 1.71E-05 | 1.19E-04 | 2.59E-04 | 1.30E-05 | 5.18E-04  | 2.07E-05 | 1.14E-03  | 2.59E-05 |
| Alimentos + suelo + agua (mg/d) |                               | 2.43E+02 | 3.41E-02  | 1.50E-02 | 5.23E+00 | 7.20E-03 | 1.14E+00 | 7.84E-02 | 1.31E+01 | 8.81E-02 | 3.29E-01  | 1.78E-02 | 4.31E+00  | 1.04E+00 |
| PC ajustado (mg/kg/d)           |                               | 8.30E+02 | 1.16E-01  | 5.10E-02 | 1.78E+01 | 2.46E-02 | 3.89E+00 | 2.67E-01 | 4.49E+01 | 3.01E-01 | 1.12E+00  | 6.06E-02 | 1.47E+01  | 3.54E+00 |
| RH ajustado (mg/kg/d)           |                               | 8.30E+02 | 1.16E-01  | 5.10E-02 | 1.78E+01 | 2.46E-02 | 3.89E+00 | 2.67E-01 | 4.49E+01 | 3.01E-01 | 1.12E+00  | 6.06E-02 | 1.47E+01  | 3.54E+00 |
| CS ajustada (mg/kg/d)           |                               | 8.30E+02 | 1.16E-01  | 5.10E-02 | 1.78E+01 | 2.46E-02 | 3.89E+00 | 2.67E-01 | 4.49E+01 | 3.01E-01 | 1.12E+00  | 6.06E-02 | 1.47E+01  | 3.54E+00 |
| Dosis diaria final (mg/kg/día)  |                               | 8.30E+02 | 1.16E-01  | 5.10E-02 | 1.78E+01 | 2.46E-02 | 3.89E+00 | 2.67E-01 | 4.49E+01 | 3.01E-01 | 1.12E+00  | 6.06E-02 | 1.47E+01  | 3.54E+00 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 199.2    | NA        | 2.28E-02 | 8.58E-01 | 1.67E-02 | 1.5      | 3.5E-02  | 11.1     | 0.2      | 0.3       | 0.2      | 0.1       | 10.3     |

Parámetros del Modelo

|                                   |          |                                                                                                    |
|-----------------------------------|----------|----------------------------------------------------------------------------------------------------|
| Peso corporal (PC; kg)            | 2.93E-01 | Gilardi y Munn, 1988                                                                               |
| Ingesta de alimentos (kg/d ph)    | 1.09E-01 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de agua (L/d)             | 2.59E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves                                     |
| Ingesta de suelo/sedimento (kg/d) | 2.62E-03 | Se asume que sea el 10% del CIA debido a las marcas dejadas por las aves en las paredes de arcilla |
| Rango de hábitat (ha)             | 1.67E+01 | Robinson et al. 2000                                                                               |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                                                    |
| Factor de cubierta de suelo (CS)  | 1.00     |                                                                                                    |





Tabla 52    Zorzalito de Swainson

| Zorzalito de Swainson           |                               | Aluminio | Antimonio | Arsénico | Bario    | Cadmio   | Cromo    | Cobalto  | Cobre    | Plomo    | Molibdeno | Selenio  | Estroncio | Vanadio  |
|---------------------------------|-------------------------------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|
| % de la Dieta                   | Dosis [mg/d]                  |          |           |          |          |          |          |          |          |          |           |          |           |          |
| 0.00                            | gusanos                       | 2.21E+02 | 6.05E-02  | 1.27E-02 | 9.71E-01 | 2.86E-02 | 4.65E-01 | 1.74E-01 | 1.37E+00 | 1.56E+00 | 6.60E-02  | 1.24E-01 | 6.17E-01  | 1.27E+00 |
| 1.00                            | hojas                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | fruta                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | peces                         | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros grandes  | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos herbívoros pequeños | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| 0.00                            | mamíferos pequeños            | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  | 0.00E+00 |
| Dosis de alimentos (mg/d)       |                               | 2.21E+02 | 6.05E-02  | 1.27E-02 | 9.71E-01 | 2.86E-02 | 4.65E-01 | 1.74E-01 | 1.37E+00 | 1.56E+00 | 6.60E-02  | 1.24E-01 | 6.17E-01  | 1.27E+00 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.21E+02 | 6.05E-02  | 1.27E-02 | 9.71E-01 | 2.86E-02 | 4.65E-01 | 1.74E-01 | 1.37E+00 | 1.56E+00 | 6.60E-02  | 1.24E-01 | 6.17E-01  | 1.27E+00 |
| Dosis de suelo (mg/d)           |                               | 5.48E+00 | 1.26E-03  | 6.59E-04 | 1.79E-02 | 1.60E-04 | 3.13E-02 | 3.44E-03 | 1.65E-01 | 3.84E-03 | 5.20E-03  | 6.44E-04 | 1.38E-03  | 4.82E-02 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 5.48E+00 | 1.26E-03  | 6.59E-04 | 1.79E-02 | 1.60E-04 | 3.13E-02 | 3.44E-03 | 1.65E-01 | 3.84E-03 | 5.20E-03  | 6.44E-04 | 1.38E-03  | 4.82E-02 |
| Dosis de agua (mg/d)            |                               | 2.64E-03 | 1.15E-06  | 1.72E-05 | 2.29E-04 | 1.15E-06 | 3.78E-06 | 2.64E-05 | 5.73E-05 | 2.87E-06 | 1.15E-04  | 4.58E-06 | 2.53E-04  | 5.73E-06 |
| x factor de biodisponibilidad   |                               | 1.00     | 1.00      | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00     | 1.00      | 1.00     | 1.00      | 1.00     |
| = dosis ajustada                |                               | 2.64E-03 | 1.15E-06  | 1.72E-05 | 2.29E-04 | 1.15E-06 | 3.78E-06 | 2.64E-05 | 5.73E-05 | 2.87E-06 | 1.15E-04  | 4.58E-06 | 2.53E-04  | 5.73E-06 |
| Alimentos + suelo + agua (mg/d) |                               | 2.26E+02 | 6.17E-02  | 1.34E-02 | 9.89E-01 | 2.87E-02 | 4.96E-01 | 1.78E-01 | 1.54E+00 | 1.56E+00 | 7.13E-02  | 1.25E-01 | 6.18E-01  | 1.32E+00 |
| PC ajustado (mg/kg/d)           |                               | 7.34E+03 | 2.00E+00  | 4.35E-01 | 3.21E+01 | 9.33E-01 | 1.61E+01 | 5.77E+00 | 5.00E+01 | 5.08E+01 | 2.31E+00  | 4.05E+00 | 2.01E+01  | 4.29E+01 |
| RH ajustado (mg/kg/d)           |                               | 7.34E+03 | 2.00E+00  | 4.35E-01 | 3.21E+01 | 9.33E-01 | 1.61E+01 | 5.77E+00 | 5.00E+01 | 5.08E+01 | 2.31E+00  | 4.05E+00 | 2.01E+01  | 4.29E+01 |
| CS ajustada (mg/kg/d)           |                               | 7.34E+03 | 2.00E+00  | 4.35E-01 | 3.21E+01 | 9.33E-01 | 1.61E+01 | 5.77E+00 | 5.00E+01 | 5.08E+01 | 2.31E+00  | 4.05E+00 | 2.01E+01  | 4.29E+01 |
| Dosis diaria final (mg/kg/día)  |                               | 7.34E+03 | 2.00E+00  | 4.35E-01 | 3.21E+01 | 9.33E-01 | 1.61E+01 | 5.77E+00 | 5.00E+01 | 5.08E+01 | 2.31E+00  | 4.05E+00 | 2.01E+01  | 4.29E+01 |
| VRT ajustado (mg/kg/d)          |                               | 4.17E+00 | 0.00E+00  | 2.24E+00 | 2.08E+01 | 1.47E+00 | 2.66E+00 | 7.61E+00 | 4.05E+00 | 1.63E+00 | 3.50E+00  | 2.90E-01 | 2.67E+02  | 3.44E-01 |
| COCIENTE DE PELIGRO             |                               | 1,759.6  | NA        | 0.2      | 1.5      | 0.6      | 6.1      | 0.8      | 12.3     | 31.2     | 0.7       | 14.0     | 0.1       | 124.7    |

Parámetros del Modelo

|                                   |          |                                                                |
|-----------------------------------|----------|----------------------------------------------------------------|
| Peso corporal (PC; kg)            | 3.08E-02 | Dunning 1984 (valor medio utilizado)                           |
| Ingesta de alimentos (kg/d ph)    | 2.52E-02 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de agua (L/d)             | 5.73E-03 | US EPA 1993; se utilizó la ecuación de CIA para todas las aves |
| Ingesta de suelo/sedimento (kg/d) | 1.26E-04 | Sample y Suter, 1994; ingesta de suelo del petirrojo americano |
| Rango de hábitat (ha)             | 4.20E-01 | Sample y Suter, 1994; Rango de hábitat del petirrojo americano |
| Factor de rango de hábitat (RH)   | 1.00     |                                                                |

